CLEAR
CENTER for LEARNING, EVALUATION, and ASSESSMENT RESEARCH
UNIVERSITY of MISSOURI—COLUMBIA

Instructional Practices in the State of Missouri and Teacher Attitude Toward the Statewide Assessment

Survey Report

Consequential Validity Study: Phase II
Mathematics Assessment

Department of Educational and Counseling Psychology
College of Education, University of Missouri—Columbia

CENTER FOR LEARNING, EVALUATION, AND ASSESSMENT RESEARCH

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SURVEY REPORT

Consequential Validity Study: Phase II
Mathematics Assessment

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OVERVIEW OF THE STUDY—SECOND YEAR

Purpose of the Study

The purpose of the study described in this document was to (a) investigate the current status of classroom instructional and curricular practices in mathematics in Missouri, and (b) compare current responses in 1999 with previous results from 1998 to ascertain changes in classroom practices that may have occurred as a result of the implementation of the Missouri Assessment Program (MAP). We also examined school, community, and educator characteristics, including involvement in development and scoring of the assessments and supporting materials, attitudes, resources, and instructional practices, in relation to the statewide assessment project.

Survey Design and Selection of the Study Sample

The sampling procedure constituted a follow-up of the stratified random sampling technique used in the previous administration of the survey. The original sampling design allowed for representation across important categorical variables throughout the state. Variables identified included grades 4, 8, and 10, and districts categorized as urban, suburban, and rural.

In the follow-up study, 222 teachers from the original sample responded to the survey. Of these respondents, 128 were from schools that participated in the spring 1997 mathematics assessment pilot and 94 were from schools that did not participate. Urban, suburban, or rural breakdowns were 9, 154, and 59 respondents respectively, and grade breakdowns were 106 4th-grade teachers, 46 8th-grade teachers, and 70 10th-grade teachers.

Table 1. Response comparison: year 1 vs. year 2.

		Year 1	Year 2
Grade	4th	49.5%	48.0%
	8th	19.1%	20.6%
	10th	31.4%	31.4%
Sex	Female	79.6%	84.1%
	Male	20.4%	15.9%
Geographic region	Urban	8.4%	4.1%
	Suburban	68.9%	69.3%
	Rural	22.7%	26.6%

COMPARISON OF 1998 AND 1999 SURVEY DATA

All corresponding questions for the 1998 and 1999 surveys were removed for comparative analysis. Two-way analysis of variance (ANOVA) was utilized with repeated measures for the year in which the survey was completed. The interaction between the pairs of items and the year in which the data were collected was significant, $F(93, 12{,}090) = 5.77$, $p = .0001$. Year comparisons for each question were then analyzed using dependent t-tests. These findings are reported below by questions for each factor.

Grading Procedures

Questions 28 through 38 asked teachers to respond to various statements about their grading procedures, using a Likert-scale format that ranges from 1 (Not important) to 5 (Important). Questions that show significance are displayed by factor group.

Performance Assessment Items

Q29: Essay tests.
Q30: Performance tasks or events.
Q31: Observation of student behavior.
Q32: Individual projects.
Q33: Group projects.
Q35: Portfolios.
Q38: Peer review.

Significant items between 1998 and 1999 response means are displayed in Figure 1.

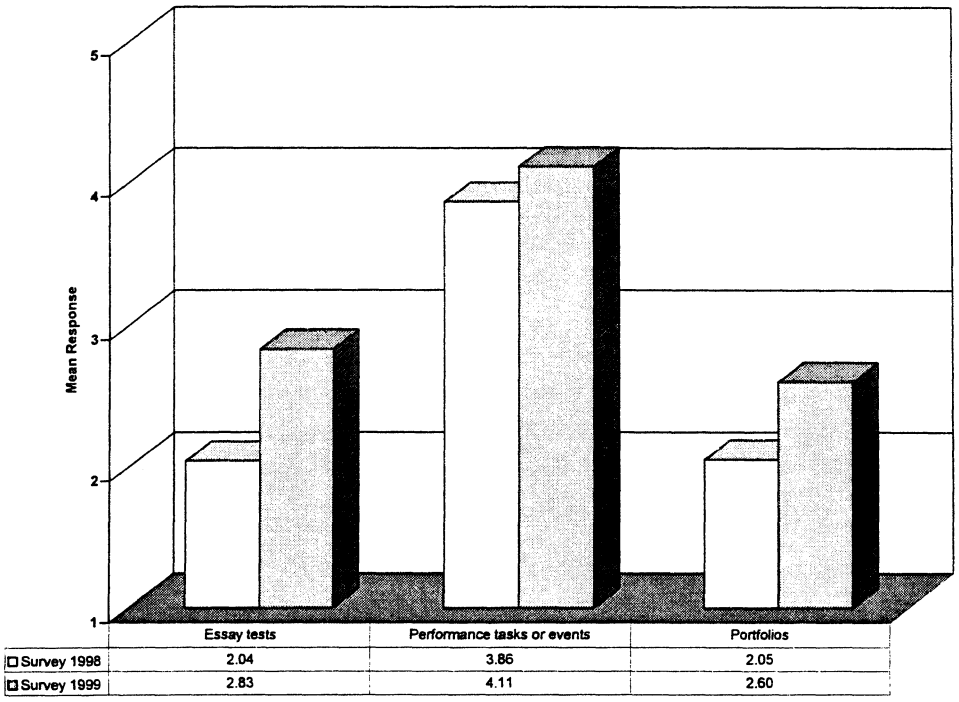


Figure 1. Comparison of mean responses, 1998 and 1999—Performance assessment items.

Results were analyzed using a paired-samples t test. For Question 29 (Essay tests), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(215) = 7.52$; $p < .0010$. For Question 30 (Performance tasks or events), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(217) = 3.33$; $p < .0010$. For Question 35 (Portfolios), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(217) = 6.06$; $p < .0001$.

In this area of performance assessment, teachers are showing an increase from the previous year in their use of essay tests, performance tasks or events, and portfolios.

Traditional Assessment Items

Q36: Completion of written worksheets. Q37: Individual seatwork.

The item that showed significance between 1998 and 1999 response means is displayed in Figure 2.

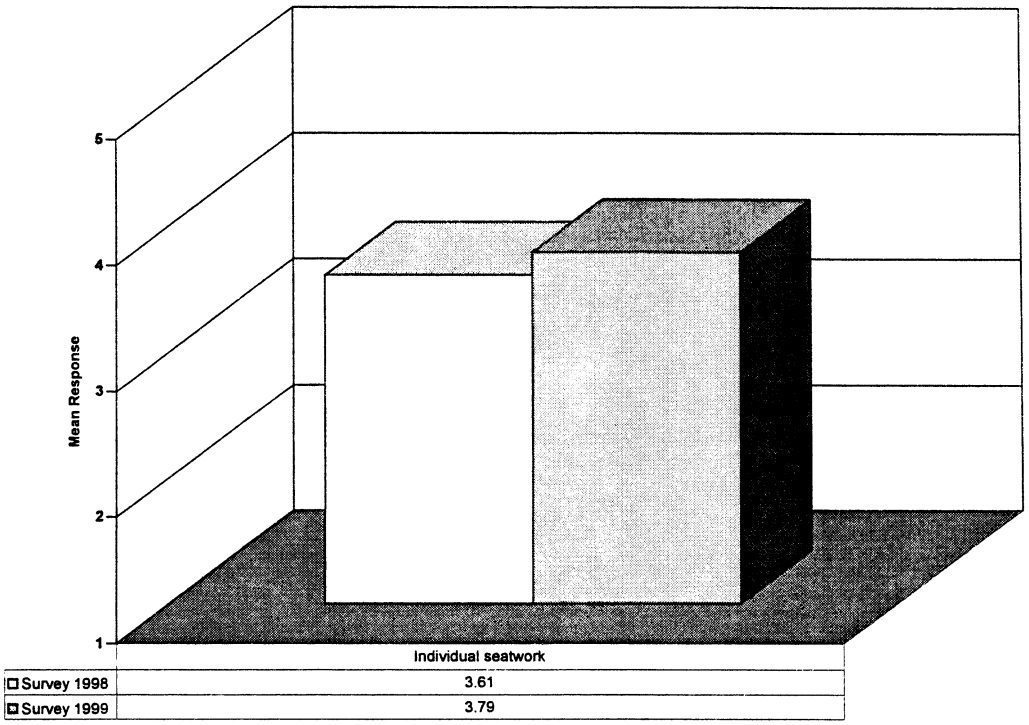


Figure 2. Comparison of mean responses, 1998 and 1999—Traditional assessment items.

Results were analyzed using a paired-samples t test. For Question 37 (Individual seatwork), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(217) = 2.10$; $p < .0367$.

In this area of traditional assessment items, teachers are showing an increase from the previous year in the amount of individual seatwork in which students engage. We note that individual seatwork can be used for portfolio management, journal keeping, and other activity-based learning, so care should be exercised in interpreting this statistic.

Instructional Influences

Questions 50 through 59 asked teachers to indicate what influences course content, using a Likert-scale format that ranges from 1 (No influence) to 5 (Very strong influence). Instructional influences responses, separated by previously reported factors, from 1998 and 1999 were compared using paired-samples t test.

Curricular Guidelines and Tests

Q50: Missouri's education curriculum framework or guidelines.
Q51: Your district's curriculum framework or guidelines.
Q53: Missouri's State Assessment Program.

The item from 1998 and 1999 that showed significance is displayed in Figure 3.

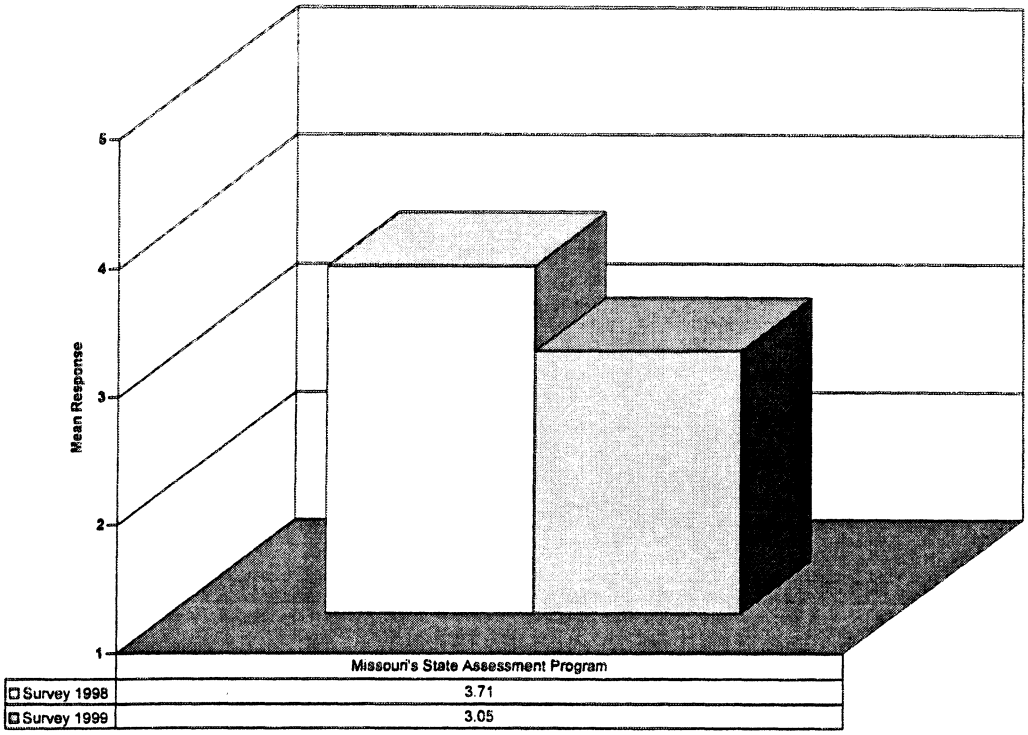


Figure 3. Comparison of mean responses, 1998 and 1999—Curricular guidelines and tests.

Results were analyzed using a paired-samples t test. For Question 53 (Missouri's State Assessment Program), analysis revealed a significant difference between mean levels of influence observed in the two years, $t(217) = -6.48$; $p < .0001$.

Teachers are reporting that the MAP affects them less this year than last year. Combined with other significant differences between the two years' answers, the interpretation of these data would indicate teachers are generally incorporating more performance-based activities as a matter of course in their classrooms without attributing their motivation to the MAP.

Teaching Environment

Q55: Your understanding of what motivates your students.
Q56: Available equipment and supplies.
Q57: Student aptitude.
Q58: Practices of other teachers.
Q59: Parents.

Items from 1998 and 1999 which showed significance are displayed in Figure 4.

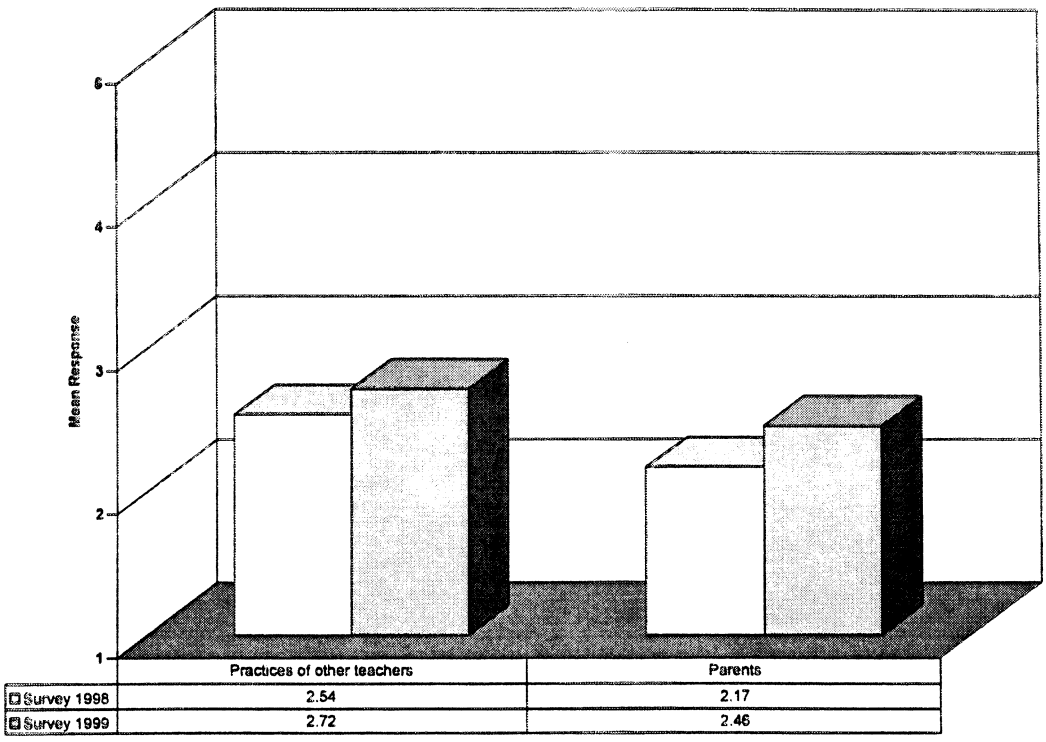


Figure 4. Comparison of mean responses, 1998 and 1999—Teaching environment.

Results were analyzed using a paired-samples t test. For Question 58 (Practices of other teachers), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(217) = 2.37$; $p < .0185$. For Question 59 (Parents), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(216) = 4.30$; $p < .0001$.

Practices of other teachers and student parents are seen by teachers as having significantly increased in influence from the responses in 1998.

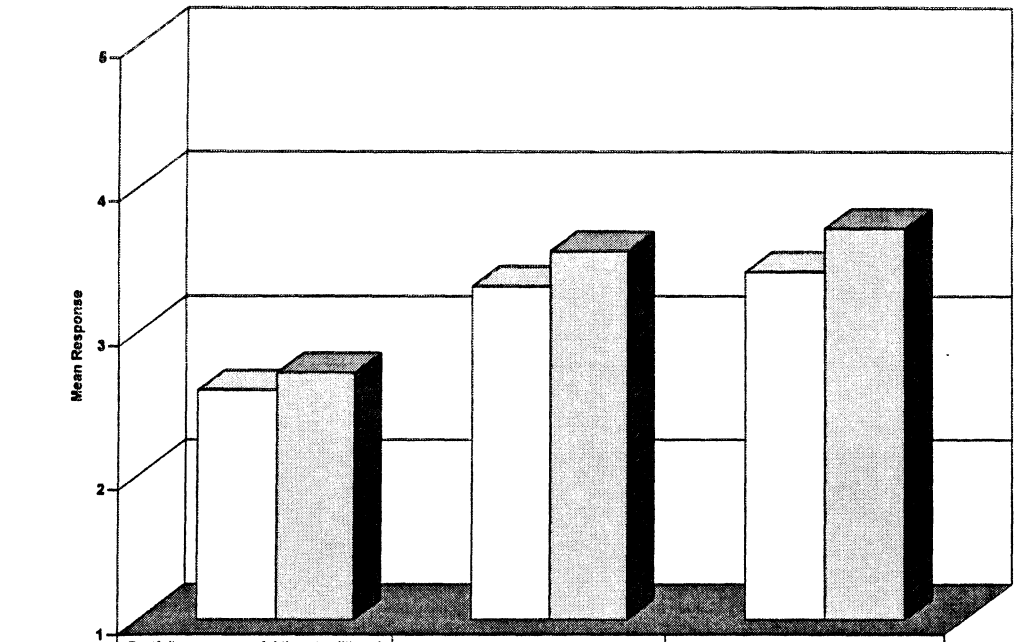
Teacher Beliefs

Questions 64 through 88 and 97 through 110 asked teachers to respond to various statements about the learning environment, using a Likert-scale format that ranges from 1 (Strongly disagree) to 5 (Strongly agree).

Student-Directed Activities

Q65: Portfolio assessment is more useful than traditional tests.
Q66: Instruction should be composed of projects and centers.
Q69: Most of teacher preparation time should be used to prepare the classroom for hands-on activities.
Q77: Students should be left to choose or form their own learning goals and objectives.
Q80: Learning should consist primarily of hands-on activities.

Items from 1998 and 1999 which showed significance are displayed in Figure 5.



	Portfolios more useful than traditional tests	Instruction by projects and centers	Preparation for hands-on activites
Survey 1998	2.59	3.31	3.41
Survey 1999	2.71	3.55	3.71

Figure 5. Comparison of mean responses, 1998 and 1999—Student-directed activities.

Post-hoc analysis used a paired-samples t test. For Question 65 (Portfolio assessment more useful than traditional tests), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(214) = 2.00$; $p < .0472$. For Question 66 (Instruction composed of projects and centers), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(214) = 3.79$; $p < .0002$. For Question 69 (Preparation for hands-on activities), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(214) = 2.55$; $p < .0114$.

Teachers indicate a belief in the efficacy of activity-based student learning more in 1999 than in 1998. The largest increase came in the belief that instruction should be composed of projects and centers, followed by the belief that a majority of teacher preparation time should be spent preparing the classroom for hands-on activities, and finally, the belief that portfolio

assessment is more useful than traditional tests. Nevertheless, teachers still do not report agreement that portfolios are more useful than traditional tests.

Traditional Teaching Strategies

Q73: The teacher should primarily lead whole group instruction. Q75: It is important to have numerical scores so that a student's progress can be compared to that of other students. Q87: Instruction should be divided into separate subject areas.

The item from 1998 and 1999 that showed significance is displayed in Figure 6.

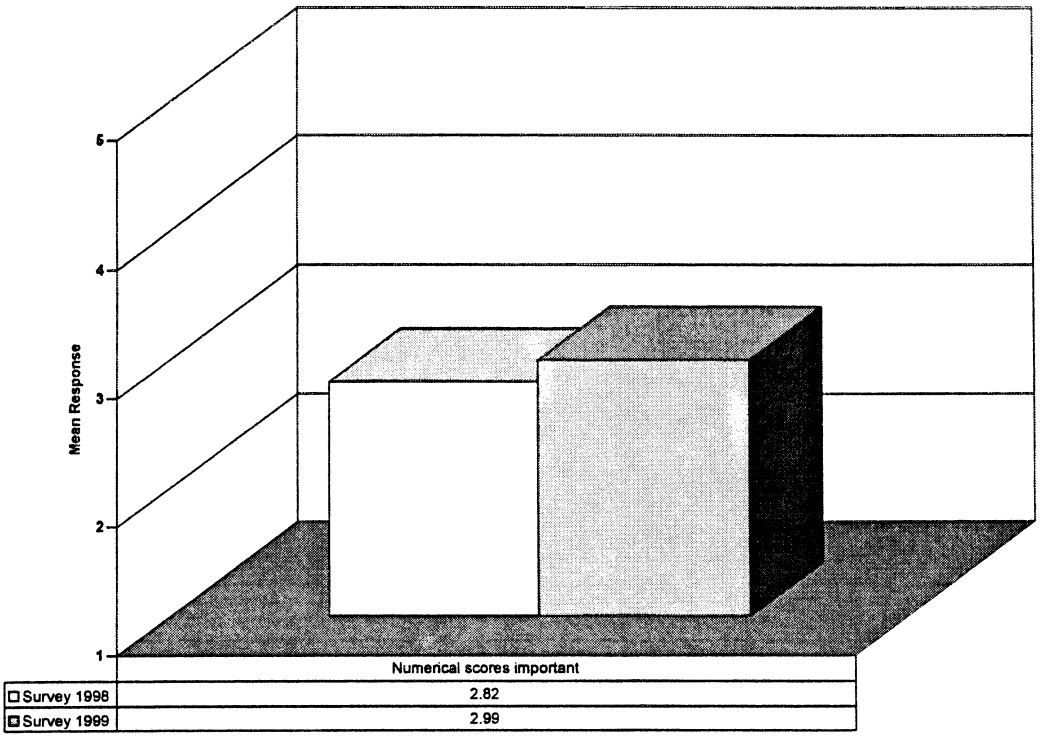


Figure 6. Comparison of mean responses, 1998 and 1999—Traditional teaching strategies.

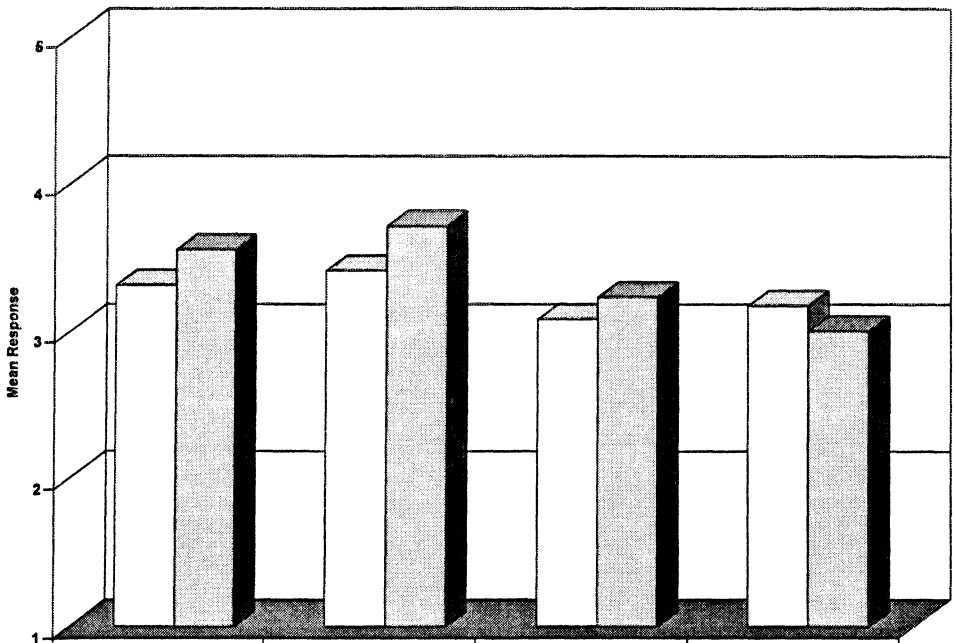
Results were analyzed using a paired-samples t test. For Question 75 (Numerical scores important), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(213) = 2.54$; $p < .0117$.

Teachers indicated a greater belief that it is important to have numerical scores so students can be compared with each other. This is not necessarily incompatible with activity-based instruction; and concern regarding MAP scores and how those scores are used is a primary concern for Missouri educators.

Basic Skills Acquisition

Q79: Teachers construct the correct understanding for students.
Q81: Students need to learn basic skills before they can learn higher order thinking skills.
Q82: It is best when only one activity is taking place at one time in the classroom.
Q83: One of the main purposes of assessment is to gauge whether or not a student has mastered the material to know whether a student can move on to the next level of instruction.
Q84: Teachers and curriculum developers should decide what children learn and how they learn it.
Q98: It is important for students to learn basic math terms and formulas before learning underlying concepts and principles.

Items from 1998 and 1999 which showed significance are displayed in Figure 7.



	Learn basic skills first	Master material before advancing	Teachers decide what children learn	Learn math basics before underlying math concepts
Survey 1998	3.31	3.41	3.08	3.17
Survey 1999	3.55	3.71	3.23	3.00

Figure 7. Comparison of mean responses, 1998 and 1999—Basic skill acquisition.

Results were analyzed using a paired-samples t test. For Question 81 (Learn basic skills first), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(213) = 3.27$; $p < .0117$. For Question 83 (Master material before advancing), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(212) = 4.79$; $p < .0001$. For Question 84 (Teachers decide what children learn), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(212) = 2.11$; $p < .0362$. For Question 98 (Learn math basics before underlying math concepts), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(216) = -2.23$; $p < .0269$.

There is still strong support for a foundational approach to education among mathematics teachers in Missouri. Teachers put more stock in students learning basic skills, in their mastering material before advancing, and in their own decisions of what students should learn. There was a decrease in the belief that math basics have to be learned in advance of their underlying concepts. These changes are not incompatible with an activity-based learning environment where guided discovery is fostered in the classroom and where teachers seek to have students develop genuine understanding.

Teacher Satisfaction

Q100: I enjoy teaching math.
Q101: I feel supported by colleagues to try out new ideas in teaching math.
Q102: I receive support from the school administration for teaching math.
Q103: Math teachers in this school regularly share ideas.
Q104: Math teachers in this school regularly observe each other teaching classes as part of sharing and improving instruction.
Q107: Most math teachers in this school contribute actively in math curriculum development.
Q109: I feel that I have many opportunities to learn new things in my present job.

Items that showed significance between 1998 and 1999 response means are displayed in Figure 8.

Figure 8. Comparison of mean responses, 1998 and 1999—Teacher satisfaction.

Results were analyzed using a paired-samples t test. For Question 103 (Math teachers here share ideas), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(215) = 3.27$; $p < .0013$. For Question 104 (Math teachers here observe each other), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(215) = 3.17$; $p < .0018$. For Question 107 (Math teachers contribute to math curriculum), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(215) = -2.68$; $p < .0079$.

Teachers of mathematics indicate they observe other teachers and share ideas more in 1999 than 1998. They seem to be engaging in more communicative activities with fellow professionals, but, they also believe themselves to be less involved in curriculum decision making.

Additional Teacher Belief Items

In addition to the significant items included in the factors, four items which did not factor showed significance. These items are listed below and displayed in Figure 9.

Q71: The teacher's part in the attainment of subject matter is to diagnose and correct errors.
Q105: Activity-based math experiences aren't worth the time and expense.
Q106: I am required to follow rules at this school that conflict with my best professional judgment about teaching and learning math.
Q108: I consider myself a "master" teacher.

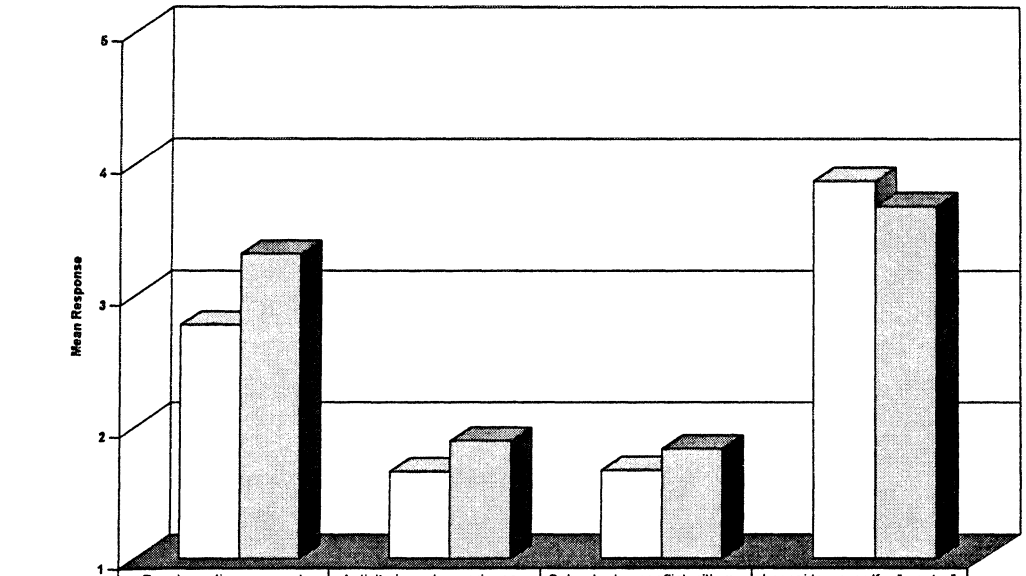


Figure 9. Comparison of mean responses, 1998 and 1999—Additional teacher belief items.

Results were analyzed using a paired-samples t test. For Question 71 (Teachers diagnose and correct errors), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(209) = 2.25$; $p < .0254$. For Question 105 (Activity-based experiences aren't worth time/expense), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(217) = 4.20$; $p < .0001$. For Question 106 (School rules conflict with my professional judgment), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(215) = 2.38$; $p < .0079$. For Question 108 (I consider myself a "master" teacher), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(216) = -3.21$; $p < .0015$.

Teachers believe more strongly in 1999 than in 1998 that a teacher's role is to diagnose and correct student errors. While still firmly in the "disagree" range, more teachers indicate in 1999 that activity-based experiences aren't worth the time and expense. Fewer teachers consider themselves "master" teachers in 1999 than 1998, and more teachers believe that school rules conflict with their professional judgment.

Again, the teacher's role to diagnose and correct errors does not exclude an activity-driven program aiming at genuine understanding. If the goal is guided discovery with a teacher providing necessary scaffolding to students, it would be normal for this number to rise.

Attitudes Toward the Missouri Assessment Program

Questions 89 through 93 asked teachers to respond to questions about the Missouri Assessment Program, using a Likert-scale format that ranges from 1 (Strongly disagree) to 5 (Strongly agree).

Teacher Attitudes Toward the Missouri Assessment Program

Q89: My overall impression of the new state assessment program is favorable.
Q90: The state assessment program is effective.
Q91: The new assessment results will be useful for instructional planning.
Q92: The new assessment results will be useful for addressing student needs.
Q93: The new assessment results will be useful for parent conferencing.

Questions that show significance are displayed in Figure 10.

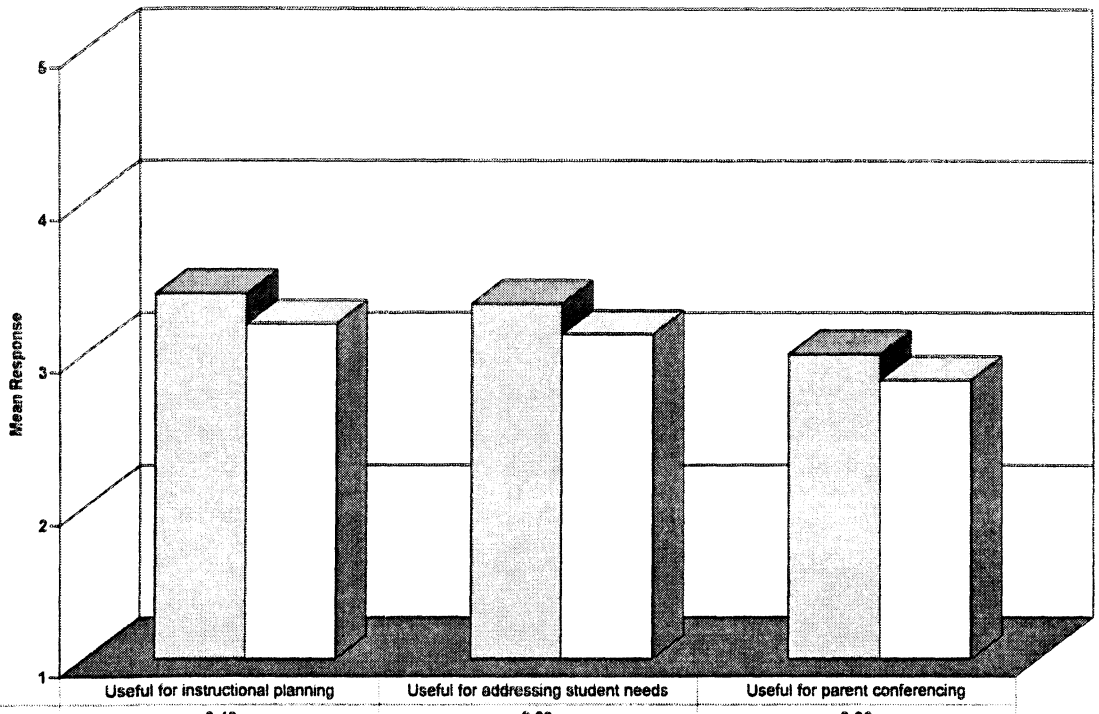


Figure 10. Comparison of mean responses, 1998 and 1999—Teacher attitudes toward the Missouri Assessment Program.

Results were analyzed using a paired-samples t test. For Question 91 (Useful for instructional planning), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(197) = -3.65$; $p < .0003$. For Question 92 (Useful for addressing student needs), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(197) = -2.64$; $p < .0089$. For Question 93 (Useful for parent conferencing), analysis revealed a significant difference between mean levels of commitment observed in the two conditions, $t(197) = -2.30$; $p < .0227$.

Teachers report that the MAP results are less useful for instructional planning, addressing student needs, and parent conferencing than they reported in 1998. Judging from teacher comments, this may be due to the lack of timeliness in receiving the results.

Feedback on the Assessment

Questions 115 through 119 asked teachers to respond to questions about the assessment itself, using a Likert-scale that runs from 1 (Poor) to 5 (Excellent). Corresponding questions from the 1998 Survey are listed below. Assessment impressions from 1998 and 1999 were compared using one-way MANOVA, between groups design.

Q115: Instructions for test.
Q116: Test materials.
Q117: Amount of time needed for test preparation and administration.
Q118: Timeliness of results.
Q119: Format.

The item that showed significance is displayed in Figure 11.

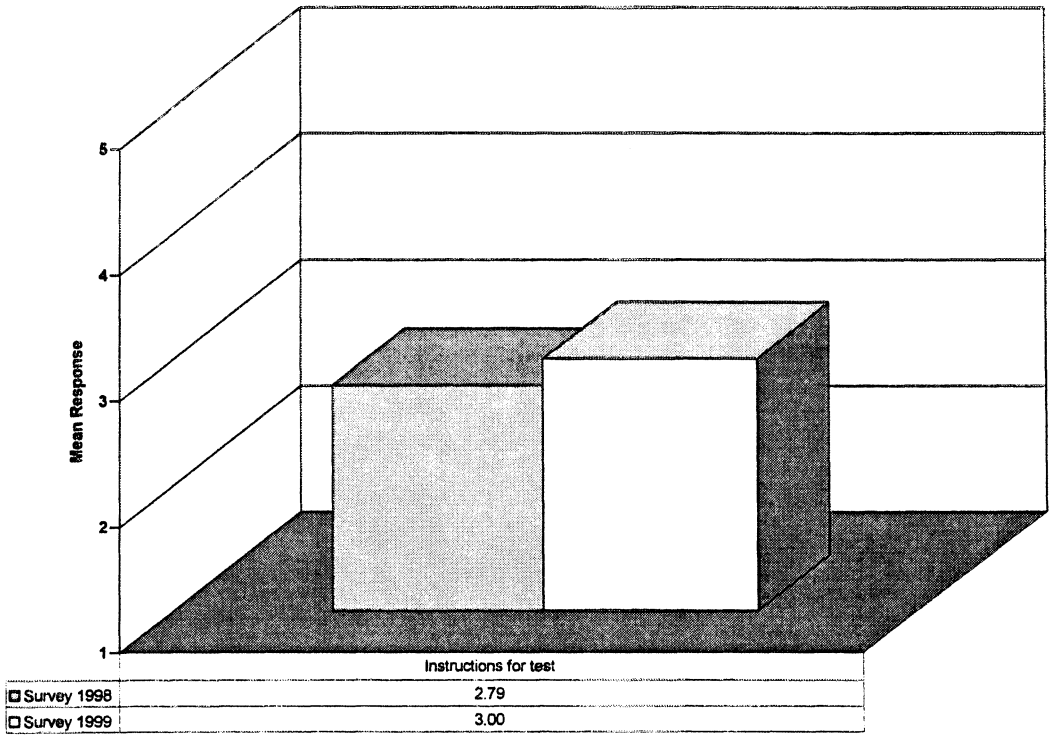


Figure 11. Comparison of mean responses, 1998 and 1999—Feedback on the assessment.

Results were analyzed using a paired-samples t test. For Question 115 (Instructions for test), analysis revealed a significant difference between mean levels of ratings observed in the two years, $t(163) = 2.49$; $p < .0137$.

Factor Comparisons

Introduction

After deriving the factors discussed in the following sections, we took each factor and compared its constituent items with those on the 1998 survey. Items that were not present on the 1998 survey were excluded in the analysis.

Importance of Grading Procedures

Two factors were identified in this area: performance assessment items and traditional assessment items. The means of the factor-based scores for each factor were analyzed using a paired-samples t test. This analysis revealed a significant difference between mean levels of response for performance assessment items by the year when the survey was completed, $t(215) = 6.51$; $p = .0001$. The sample means are displayed in Table 2, which shows that the mean scores were significantly higher in 1999 than in 1998. This analysis also revealed a significant difference between mean levels of response for traditional assessment items by the year when the survey was completed, $t(217) = 2.00$; $p = .0467$. These means are also displayed in Table 2 and show that the mean scores were significantly higher in the 1999 responses.

Table 2. Importance of grading procedures, by survey year.

Variable	n	Mean	SD
Performance Assessment Items 1998	216	11.53	2.95
Performance Assessment Items 1999	219	13.06	3.23
Traditional Assessment Items 1998	218	7.32	1.98
Traditional Assessment Items 1999	219	7.59	1.74

This table indicates that teachers more strongly agree in 1999 than in 1998 that performance assessment items are useful in the classroom. They also agree more that traditional assessment items are important for the same purpose. This would indicate an increased focus on assessment overall.

Teacher Preparation

Two factors were identified in this area: preparation for teaching to individual differences and preparation for teaching with innovative methods. The scores from the 1998 survey and the 1999 survey were first standardized because the 1998 scale was modified for the 1999 survey. The means of the factor-based scores for each factor were then analyzed using a paired-samples t test. This analysis revealed no significant difference between mean levels of response for the first and second factors by the year when the survey was completed.

Instructional Influences

Two factors were identified in this area: externally mandated influences and locally motivated influences. The means of the factor-based scores for each factor were analyzed using a paired-samples t test. This analysis revealed a significant difference between mean levels of response for the externally mandated influences by the year when the survey was completed, t

(215) = -3.42; p = .0008. The sample means are displayed in Table 3, which shows that the mean scores were significantly lower in 1999 than in 1998. The second factor revealed no significance.

Table 3. Importance of instructional influences, by survey year.

Variable	n	Mean	SD
Externally Mandated Influences 1998	217	11.87	2.41
Externally Mandated Influences 1999	218	11.32	2.02

This table indicates that teachers feel less influenced in 1999 than in 1998 by Missouri's mathematics education curriculum framework or guidelines, Missouri State Assessment Program, and their own district's curriculum framework or guidelines.

Teacher Beliefs

Five factors were identified in this area: teacher satisfaction, performance-based teaching strategies, basic skills acquisition, student-directed activities, and traditional teaching strategies. The means of the factor-based scores for each factor were analyzed using a paired-samples t test. This analysis revealed a significant difference between mean levels of response for the basic skills acquisition and student-directed activities by the year when the survey was completed, t (209) = 2.67; p = .0081, and t (212) = 2.86; p = .0047, respectively. The sample means are displayed in Table 4, which shows that the mean scores were significantly higher in 1999 than in 1998 on both basic skills acquisition, and student-directed activities. The other factors revealed no significance.

Table 4. Importance of teacher belief factors, by survey year.

Variable	n	Mean	SD
Basic Skills Acquisition 1998	214	18.57	3.77
Basic Skills Acquisition1999	215	19.07	3.53
Student-Directed Activity1998	215	13.74	2.75
Student-Directed Activity1999	217	14.24	3.05

This table indicates that more teachers agree that basic skills are preparatory to conceptual thought. It also indicates that more teachers agree that students should direct their own activities in 1999 than in 1998.

YEAR 2 FINDINGS

Class Scheduling

Questions 1 through 3 asked teachers to identify the length and frequency of class periods for the most recent unit covered. Tables 5 through 7 indicate the percentage responses to these questions.

Table 5. Response percentages to Question 1: Are you on block scheduling for this course?

		No	Yes	n
Total sample		69.8	30.2	222
Grade	4th	94.3	5.7	106
	8th	69.6	30.4	46
	10th	32.9	67.1	70
Geographic region	Urban	44.4	55.6	9
	Suburban	72.1	27.9	154
	Rural	67.8	32.2	59

Table 6. Response percentages, for total sample, to Question 2: How many times per week does the class for which you are answering this survey meet?

One time	Two times	Three times	Four times	Five times	n
0.0	3.2	16.5	4.6	75.7	218

Table 7. Response percentages, for total sample, to Question 3: How long is each of these class periods?

Under 40 min.	40-60 min.	61-90 min.	91-120 min.	Greater than 120 min.	n
1.8	67.9	27.6	2.7	0.0	221

Expectations Outside of Class

Questions 4 and 5 asked teachers to identify frequency and expected time spent by students on the assigned homework. Tables 8 and 9 indicate the percentage responses to the questions.

Table 8. Response percentages, for total sample, to Question 4: How often do you usually assign homework?

Never	Less than 1/2 of class periods	1/2 of class periods	More than 1/2 of class periods	Every day	n
2.7	20.3	9.5	35.6	32.0	222

Table 9. Response percentages, for total sample, to Question 5: How many minutes do you expect your average student to spend on the homework you assign?

None assigned	Less than 15 min.	15-30 min.	31-60 min.	More than 60 min.	n
2.7	14.4	63.5	18.5	0.9	222

Questions 6 through 10 were related to the types of work expected of students outside of class for the unit specified in Part 3 of the survey. Table 10 reports the percentage responses for the total sample.

Table 10. Response percentages, for total sample, to Questions 6 through10.

Question	No	Yes	n
6: Read textbook.	61.5	38.5	221
7: Complete an independent project.	34.8	65.2	221
8: Complete worksheets.	9.0	91.0	221
9: Keep a journal.	85.9	14.1	220
10: Complete a group project.	77.2	22.8	220

As Table 10 indicates for the mathematics unit described in Part 3, 62% of the sample report that students were not expected to read a mathematics book outside of class, 86% were not

expected to keep a mathematics journal, and 35% were not expected to complete a group project. In addition, 91% reported that students were expected to complete worksheets outside of class, and 65% reported that students were expected to complete an independent project.

Instructional Practices in Mathematics

Questions 11 through 27 of the survey were designed to collect information about teacher practices throughout the state of Missouri. For each question, teachers were asked, "How often does the average student do these things *in* class?" Teachers were given a choice of five Likert-scale responses ranging from 1 (Never) to 5 (Almost all class period) to indicate the amount of time they engaged in each of the instructional practices. Summary data of the responses to these questions for the entire teacher sample, as well as these data broken down by grade (4th, 8th, and 10th grade), geographic region (urban, suburban, and rural), and participation in the 1997 pilot assessment (pilot and non-pilot), are found in Appendix B.

Results for Questions 11 through 27 were analyzed using one-way MANOVA, between-groups design. This analysis revealed a significant multivariate effect for grade, Wilks' Lambda = .60, $F(34, 396) = 3.35$; $p < .0001$. Analysis also revealed a significant multivariate effect for geographic region, Wilks' Lambda = .73, $F(34, 396) = 2.03$; $p < .0008$.

Individual items were analyzed using one-way ANOVA, between-groups design. For items that showed statistical significance by the categorical variables, the test results are reported and the percentage of teachers who responded to each choice on the Likert scale (1, 2, 3, 4, or 5) are represented in graphical and tabular form. For items that were not statistically significant by the categorical variables, response patterns for the total sample are reported.

Question 11 elicited information to determine how often teachers explained something about mathematics in their typical class period. For the categorical variables, no statistically significant relationships were found. The percent of teachers who responded to each option of the Likert scale is reported in Figure 12.

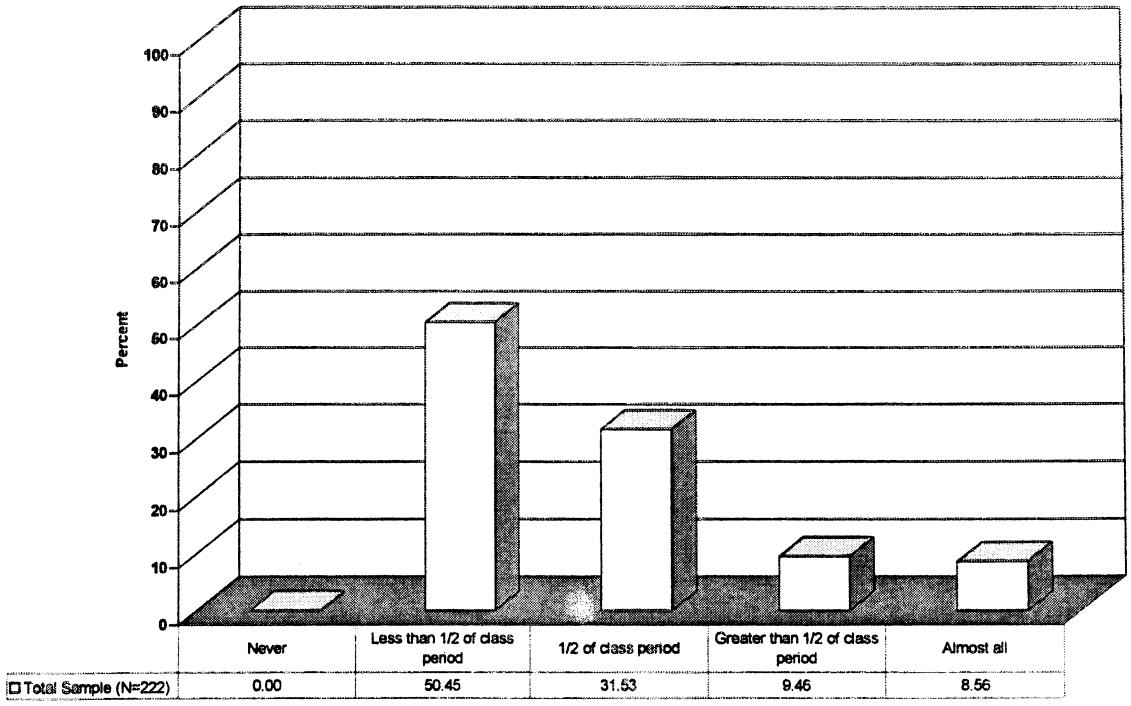
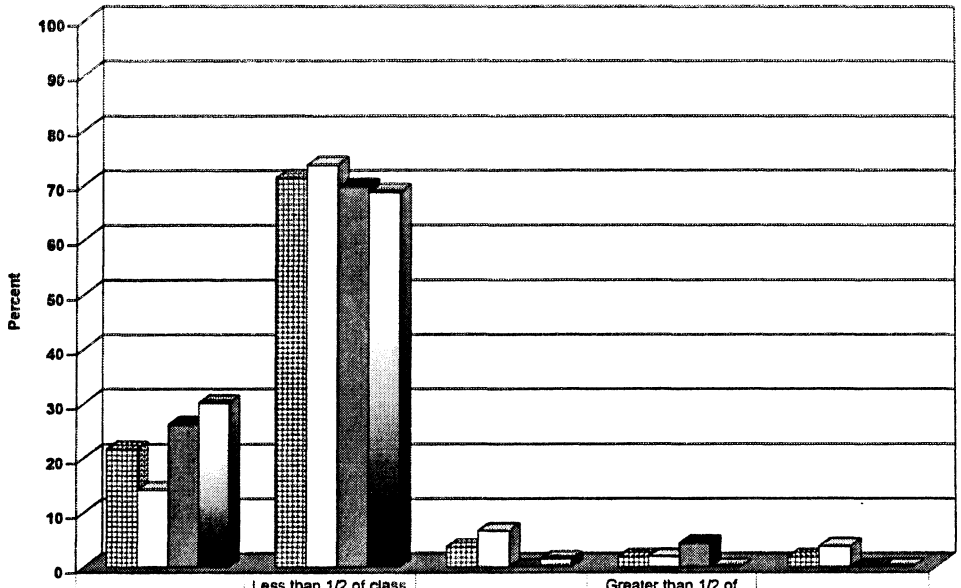


Figure 12. Response percentages, for total sample, to Question 11: Listen to the teacher explain something about mathematics.

As indicated in the figure, 50% of the teachers indicated that students spend less than 1/2 the class period listening to the teacher explain something about math. Thirty-two percent (32%) of the sample report spending half of the class period listening to the teacher, while 18% spend greater than half of the class period engaged in this activity.

Question 12 asked teachers how often they required students to read about mathematics from a textbook during a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 6.91$; $p < 0.0012$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers. Summary data for this question, categorized by grade, can be found in Figure 13.

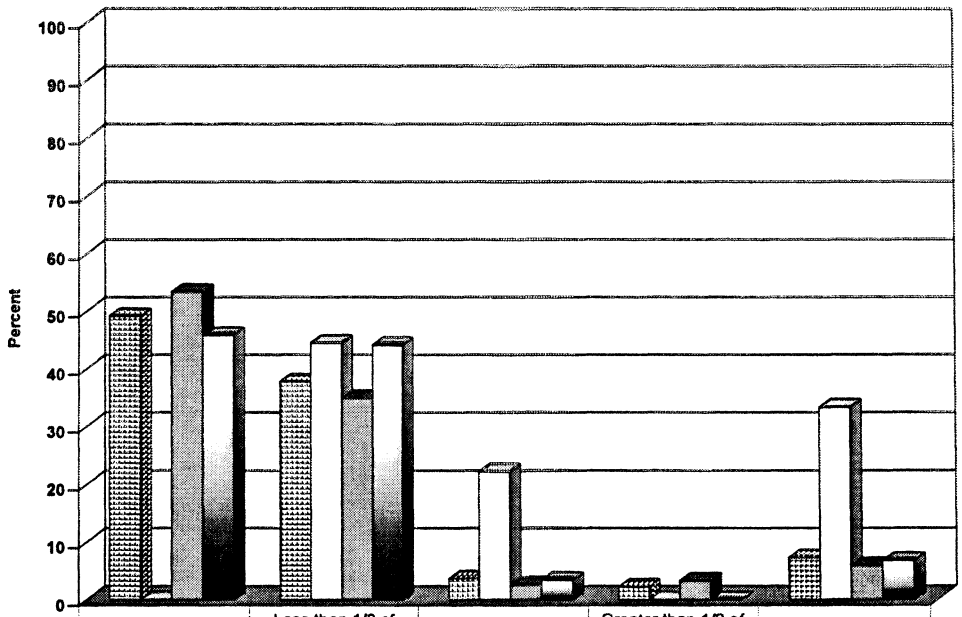


	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	21.62	71.17	3.60	1.80	1.80
Grade 4 (n=106)	14.15	73.58	6.60	1.89	3.77
Grade 8 (n=46)	26.09	69.57	0.00	4.35	0.00
Grade 10 (n=70)	30.00	68.57	1.43	0.00	0.00

Figure 13. Response percentages, by grade, to Question 12: Read from a textbook.

No significant relationships were found between responses to this question and geographical region or participation in the pilot assessment.

Question 13 was designed to determine how often teachers require students to maintain a portfolio in their typical mathematics class. Analysis revealed a significant difference for grade, $F(2, 214) = 7.95$; $p < 0.0005$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There were no significant differences between responses of suburban and rural teachers. Summary data can be found in Figure 14.



	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=220)	49.09	37.73	3.64	2.27	7.27
Urban (n=9)	0.00	44.44	22.22	0.00	33.33
Suburban (n=152)	53.29	34.87	2.63	3.29	5.92
Rural (n=59)	45.76	44.07	3.39	0.00	6.78

Figure 14. Response percentages, by geographic region, to Question 13: Maintain a portfolio of his/her own work.

As indicated in the figure, 49% of the respondents indicated that students do not maintain a portfolio. Care should be used when interpreting this statistic because of the small urban sample.

No significant relationships were found between responses to this question and grade or participation in the pilot assessment.

Question 14 asked teachers how often they required students to work in pairs or in small groups in a typical class period. For the categorical variables, no statistically significant relationships were found. Figure 15 represents the summary data for this question.

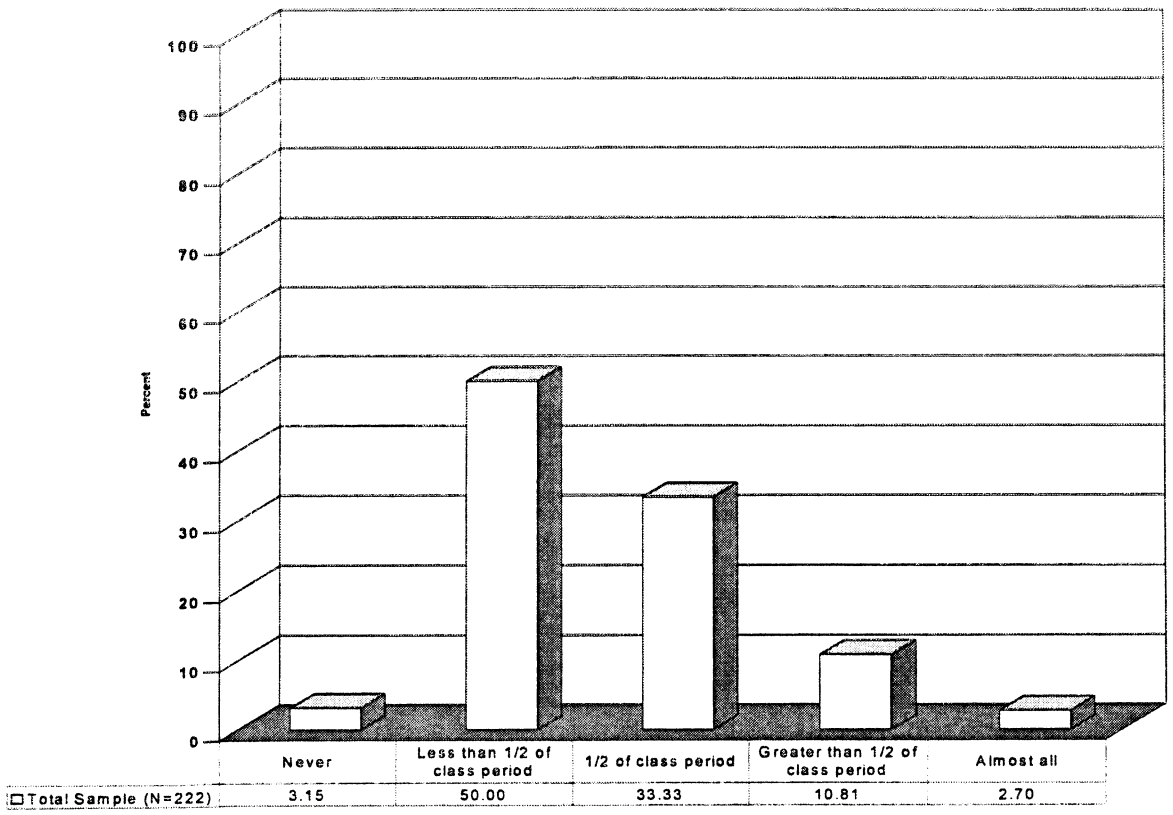


Figure 15. Response percentages, for total sample, to Question 14: Work in pairs or small groups.

Working in pairs or small groups appears to be used frequently with only 3% of the respondents indicating no pair or group work.

Question 15 asked teachers how often a computer is used in the classroom. For the categorical variables, no statistically significant relationships were found. Summary data are presented in Figure 16.

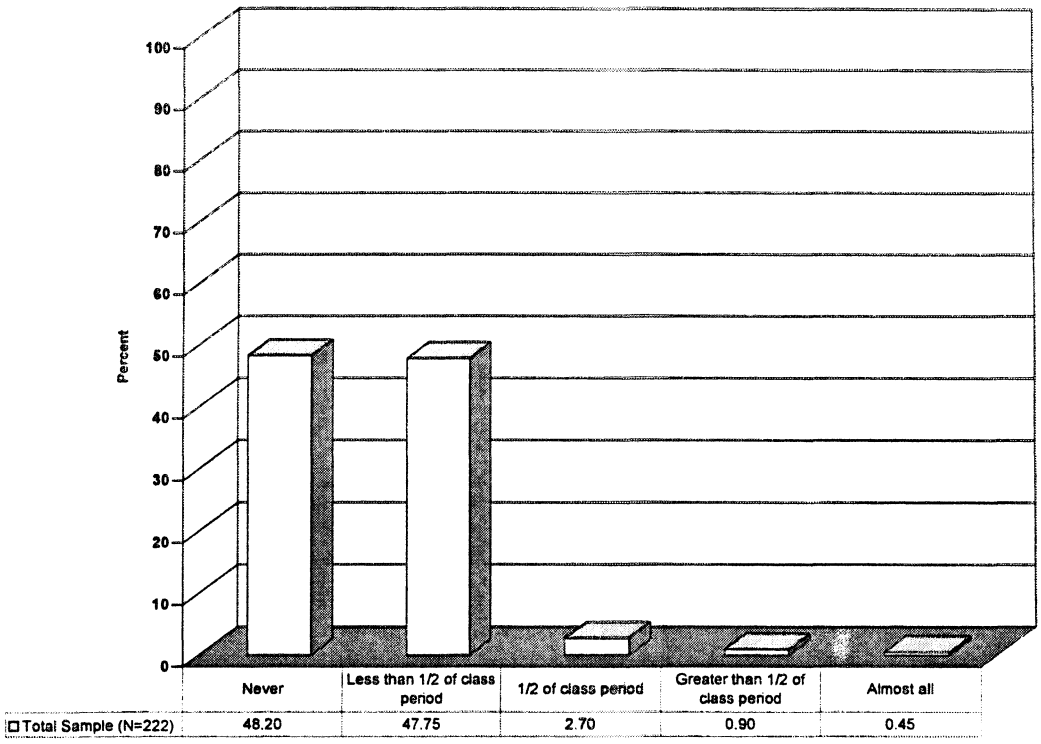


Figure 16. Response percentages, for total sample, to Question 15: Use the computer.

Forty-eight percent (48%) of total respondents report never using a computer in their mathematics classroom. Of this group, 24% (52 teachers) report that computers are not even available for their use, with the remaining 24% responding that computer equipment is available, but is not used.

Question 16 asked teachers how often students answer questions from a textbook or worksheet during a typical class period. For the categorical variables, no statistically significant relationships were found. Figure 17 represents the summary data for this question.

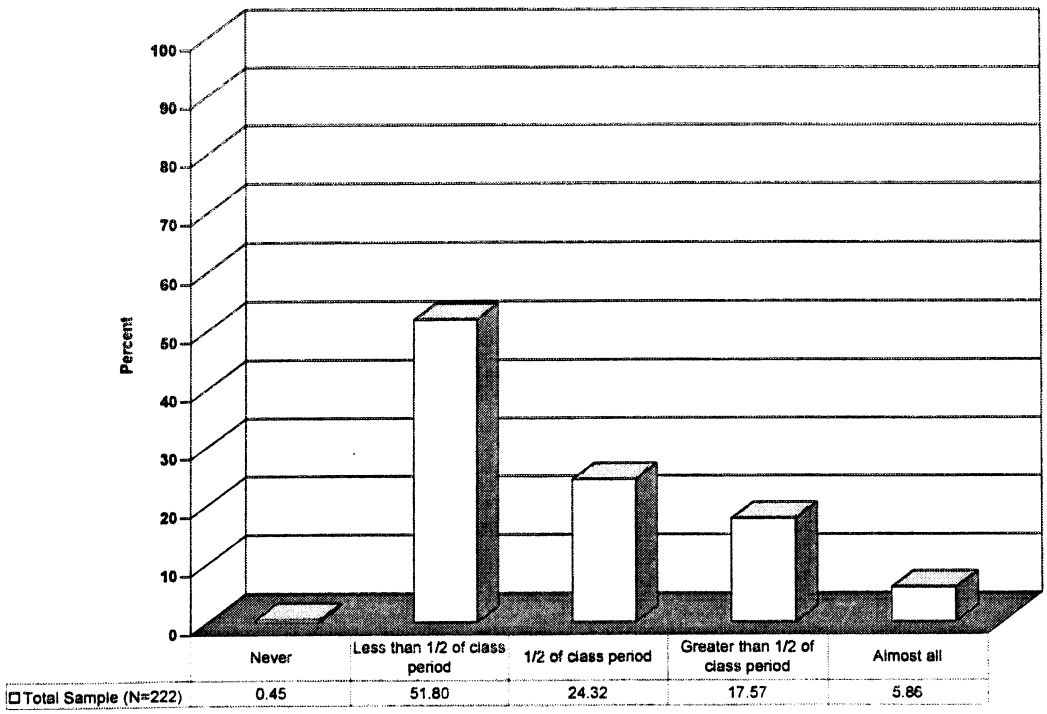
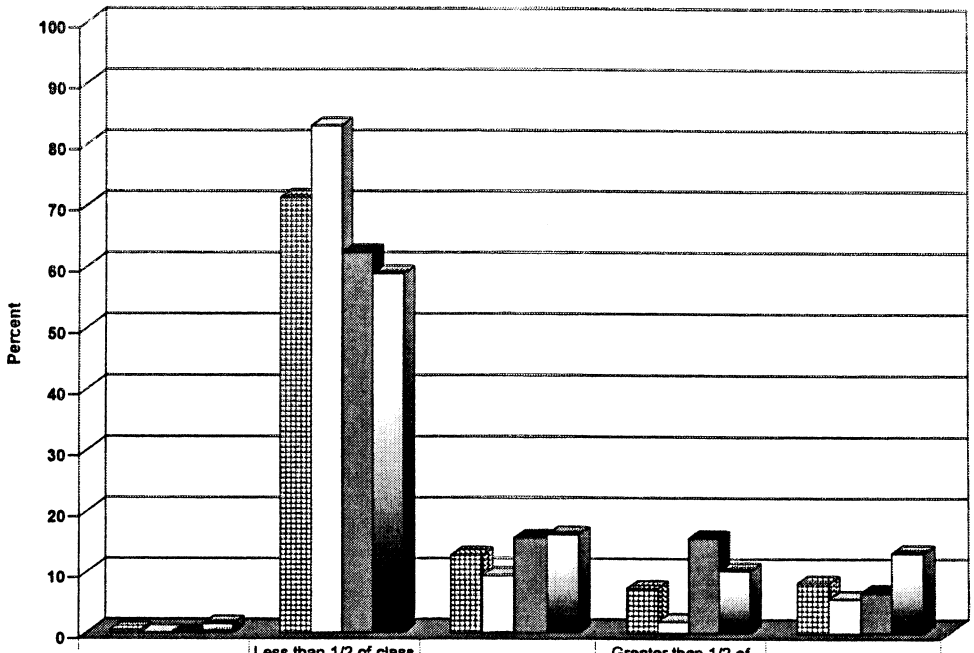


Figure 17. Response percentages, for total sample, to Question 16: Answer questions from a textbook or a worksheet.

Answering questions from a textbook or worksheet is a method used by almost the entire sample. Forty-eight percent (48%) of the sample report students answer questions from the textbook or worksheet for at least half or more of a typical class period.

Question 17 asked teachers how often students take a quiz or test in a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 5.08$; $p < 0.0070$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers. Figure 18 represents the summary data for this question.

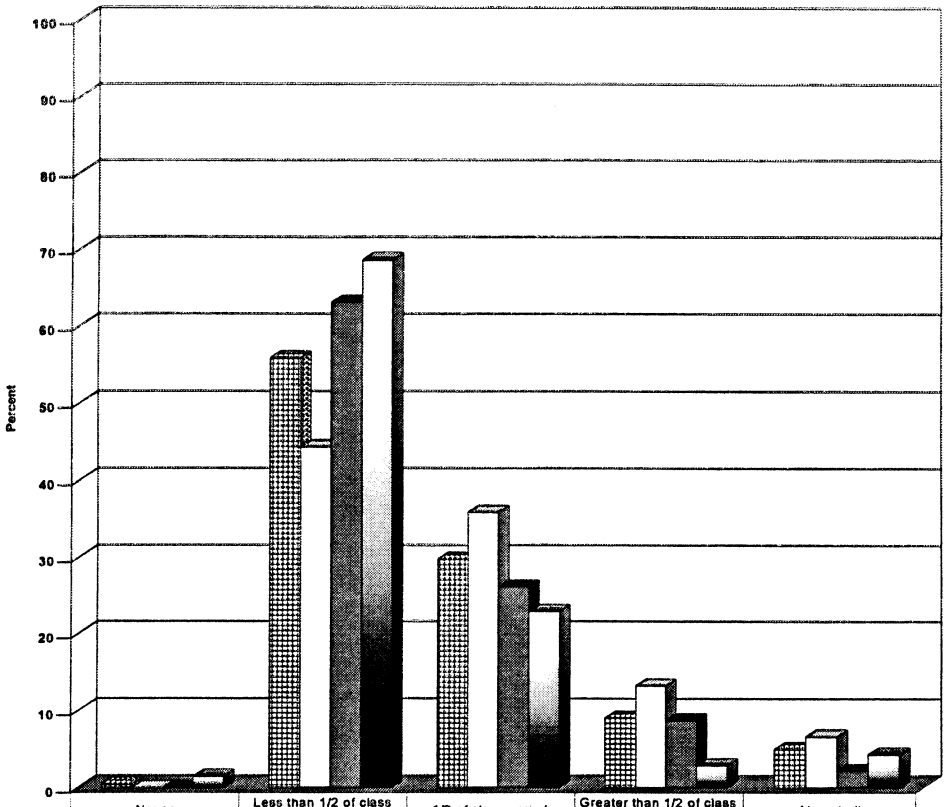


	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=219)	0.46	71.23	12.79	7.31	8.22
Grade 4 (n=106)	0.00	83.02	9.43	1.89	5.66
Grade 8 (n=45)	0.00	62.22	15.56	15.56	6.67
Grade 10 (n=68)	1.47	58.82	16.18	10.29	13.24

Figure 18. Response percentages, by grade, to Question 17: Take a quiz or test.

No significant relationships were found between responses to this question and geographical region or participation in the pilot assessment.

Question 18 assessed how often teachers required their students to engage in whole class discussions in a typical mathematics class. Analysis revealed a significant difference for grade, $F(2, 214) = 5.89$; $p < 0.0032$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers. Figure 19 displays the summary data.



	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	0.45	55.86	29.73	9.01	4.95
Grade 4 (n=106)	0.00	44.34	35.85	13.21	6.60
Grade 8 (n=46)	0.00	63.04	26.09	8.70	2.17
Grade 10 (n=70)	1.43	68.57	22.86	2.86	4.29

Figure 19. Response percentages, by grade, to Question 18: Take part in a whole class discussion.

No significant relationships were found between responses to this question and geographical region or participation in the pilot assessment.

Question 19 was designed to determine how often teachers encouraged students to ask questions to improve their understanding of mathematics in a typical class period. For the categorical variables, no statistically significant relationships were found. Figure 20 illustrates the summary data for this question.

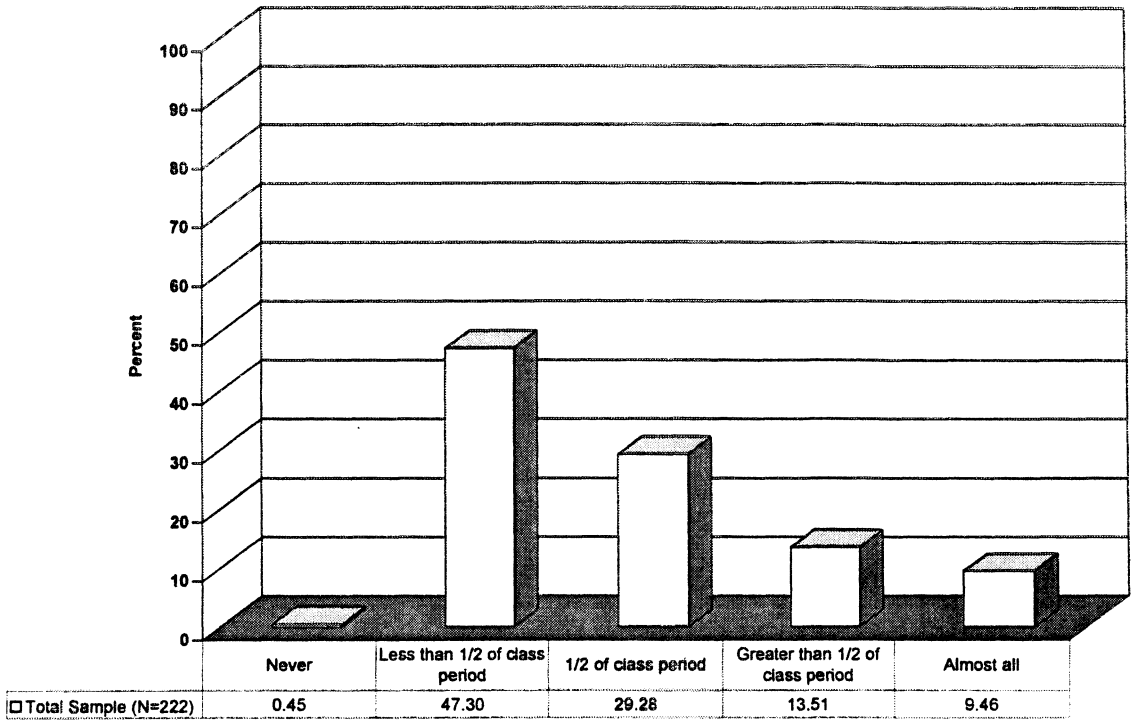
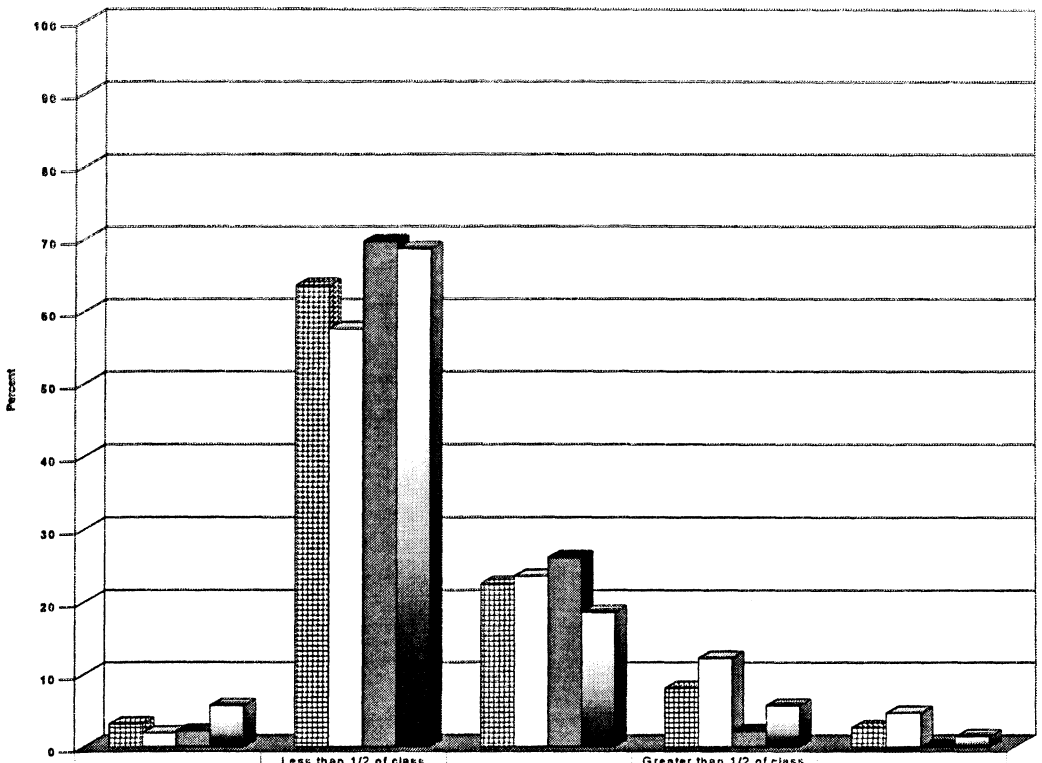


Figure 20. Response percentages, for total sample, to Question 19: Ask questions to improve understanding.

Question 20 was used to collect data on how often teachers asked their students to make predictions, guesses, or hypotheses in a typical mathematics class. Analysis revealed a significant difference for grade, $F(2, 214) = 4.54$; $p < 0.0117$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers. Summary data are found in Figure 21.

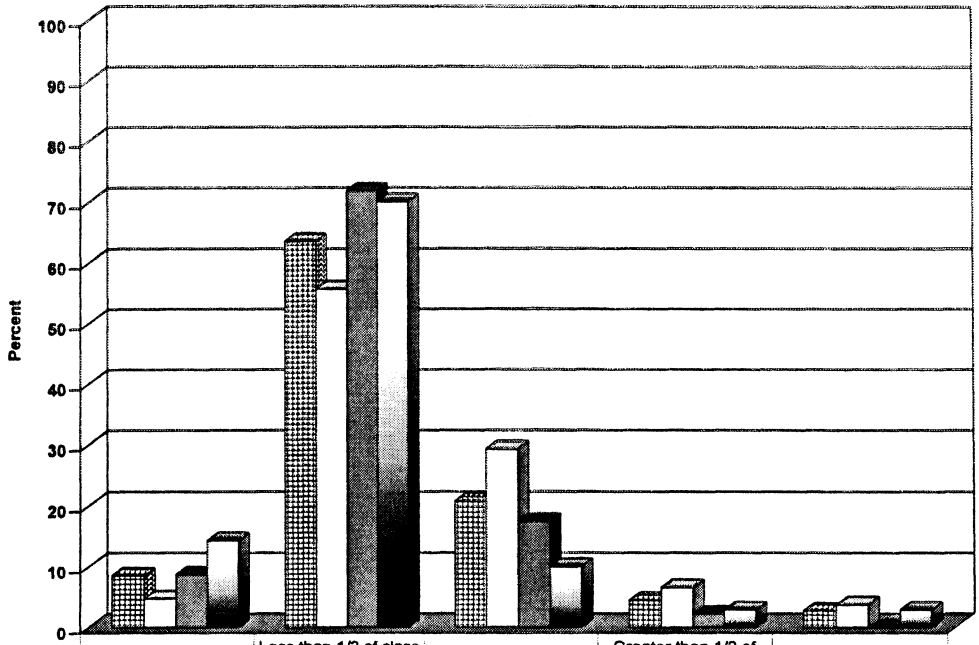


	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	3.15	63.51	22.52	8.11	2.70
Grade 4 (n=106)	1.88	57.55	23.58	12.26	4.72
Grade 8 (n=46)	2.17	69.57	26.09	2.17	0.00
Grade 10 (n=70)	5.71	68.57	18.57	5.71	1.43

Figure 21. Response percentages, by grade, to Question 20: Make predictions, guesses or hypotheses.

No significant relationships were found between responses to this question and geographical region or participation in the pilot assessment.

Question 21 assessed how often teachers asked their students to make maps, drawings, or models to illustrate their mathematical ideas during a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 6.35$; $p < 0.0021$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers and the responses of 4th- and 8th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 8th- and 10th-grade teachers. Figure 22 displays the summary data for this question.

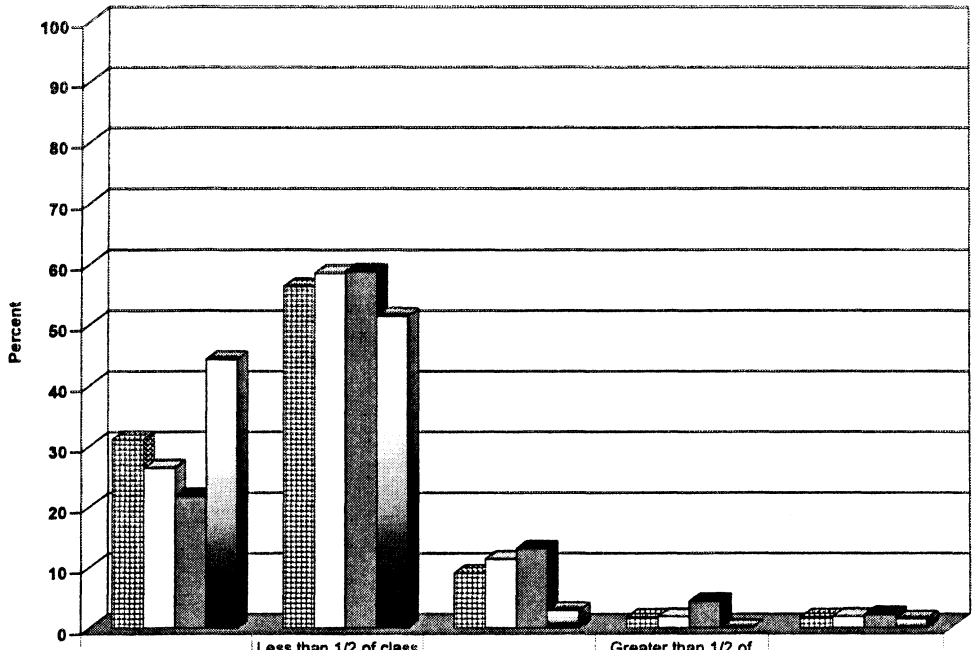


	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	8.56	63.51	20.72	4.50	2.70
Grade 4 (n=106)	4.72	55.66	29.25	6.60	3.77
Grade 8 (n=46)	8.70	71.74	17.39	2.17	0.00
Grade 10 (n=70)	14.29	70.00	10.00	2.86	2.86

Figure 22. Response percentages, by grade, to Question 21: Make maps, drawings, or models to show ideas.

No significant relationships were found between responses to this question and geographical region or participation in the pilot assessment.

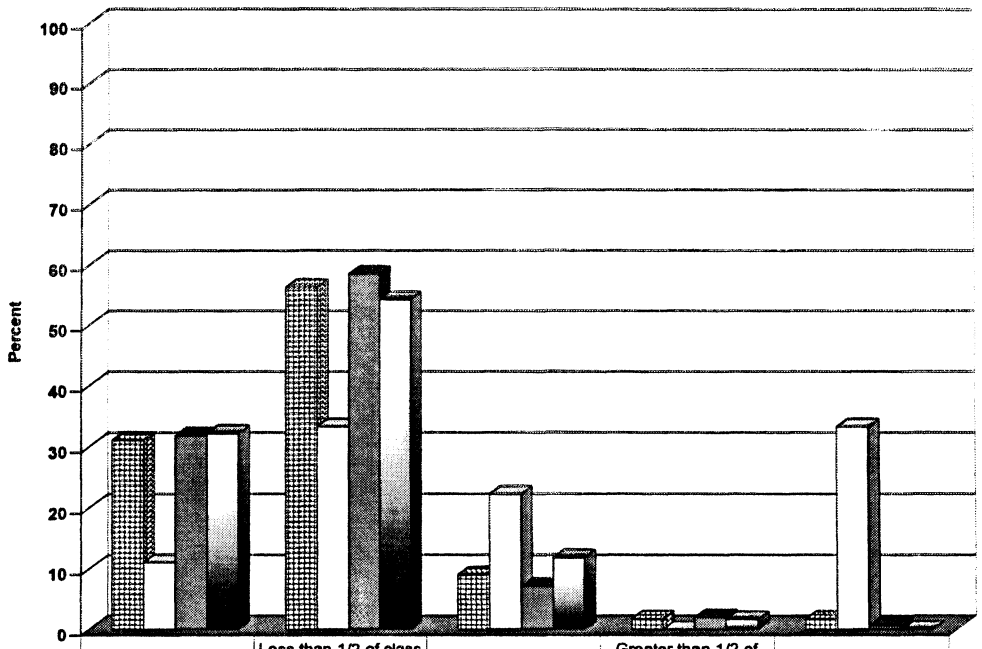
Question 22 was designed to determine how often teachers required their students to score or grade their own work with the use of a scoring guide or rubric during a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 4.76$; $p < 0.0095$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers and the responses of 8th- and 10th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 4th- and 8th-grade teachers. Figure 23 reveals summary data for this question.



	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	31.08	56.31	9.01	1.80	1.80
Grade 4 (n=106)	26.42	58.49	11.32	1.89	1.89
Grade 8 (n=46)	21.74	58.70	13.04	4.35	2.17
Grade 10 (n=70)	44.29	51.43	2.86	0.00	1.43

Figure 23. Response percentages, by grade, to Question 22: Score or grade his/her own work using a scoring guide or rubric.

Question 22 also showed a significant difference for geographic region, $F(2, 214) = 12.68$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There was no significant difference between responses of suburban and rural teachers. Figure 24 reveals summary data for this question.



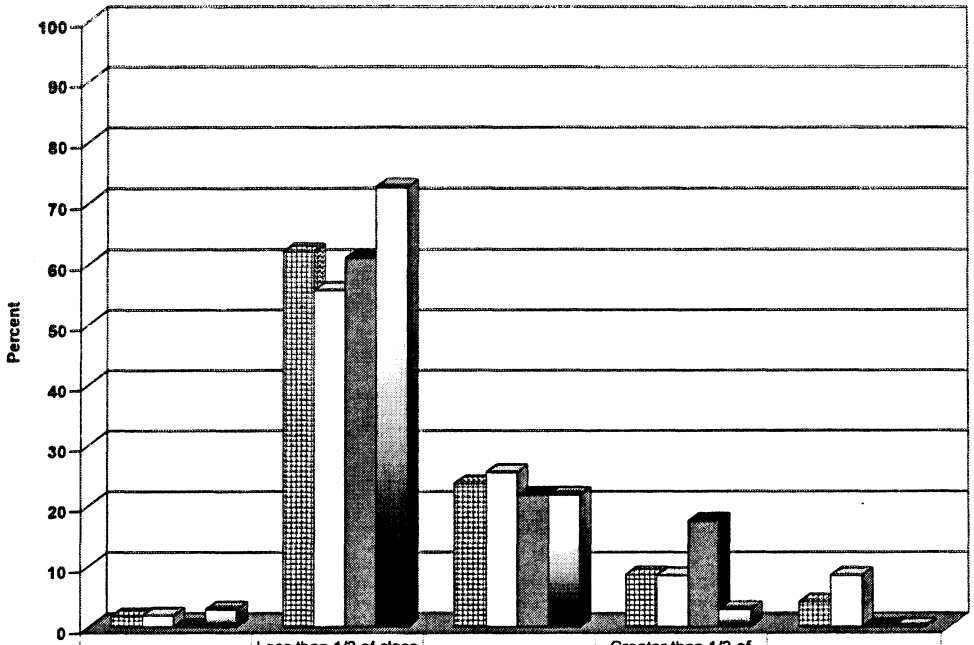
	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	31.08	56.31	9.01	1.80	1.80
Urban (n=9)	11.11	33.33	22.22	0.00	33.33
Suburban (n=154)	31.82	58.44	7.14	1.95	0.65
Rural (n=59)	32.20	54.24	11.86	1.69	0.00

Figure 24. Response percentages, by geographic region, to Question 22: Score or grade his/her own work using a scoring guide or rubric.

Care should be used when interpreting these data because of the small urban sample.

No significant relationship was found between responses to this question and participation in the pilot assessment.

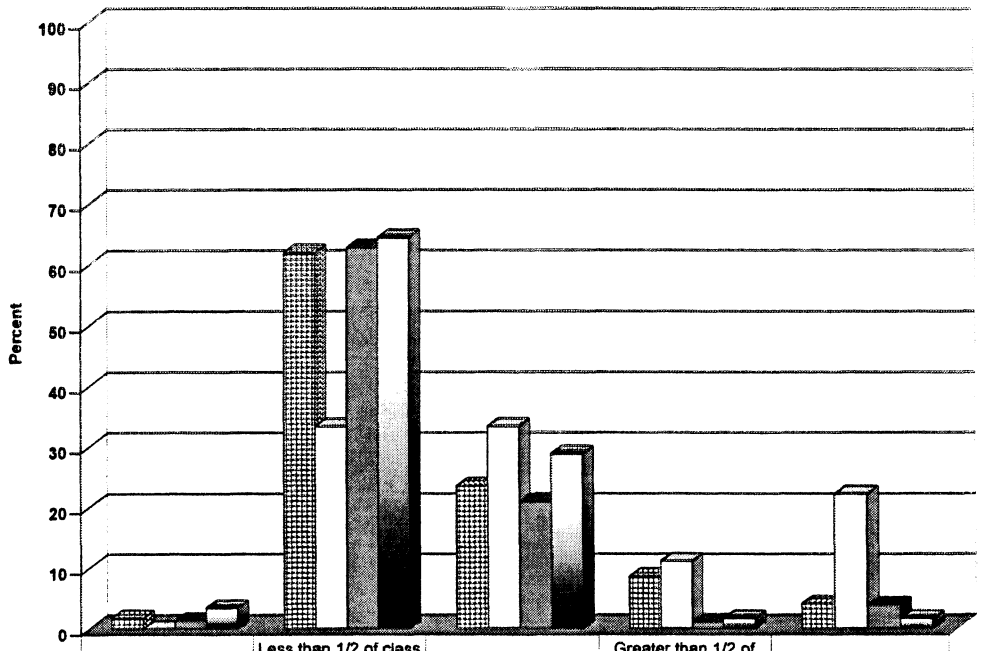
Question 23 was designed to assess how often teachers required their students to apply mathematical concepts to everyday life in a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 4.92$; $p < 0.0081$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers. The summary data are displayed in Figure 25.



	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=221)	1.81	61.99	23.53	8.60	4.07
Grade 4 (n=106)	1.89	55.66	25.47	8.49	8.49
Grade 8 (n=46)	0.00	60.87	21.74	17.39	0.00
Grade 10 (n=69)	2.90	72.46	21.74	2.90	0.00

Figure 25. Response percentages, by grade, to Question 23: Apply mathematical concepts discussed in class to everyday life.

Question 23 also showed a significant difference for geographic region, $F(2, 214) = 4.53$; $p < 0.0118$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There was no significant difference between responses of suburban and rural teachers. Figure 26 reveals summary data for this question.



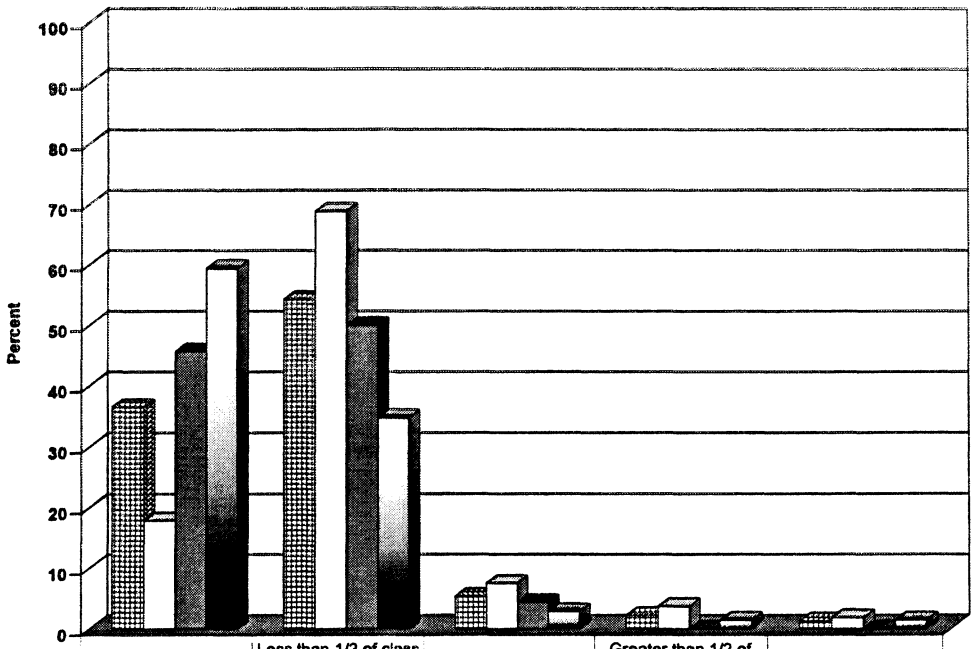
	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=221)	1.81	61.99	23.53	8.60	4.07
Urban (n=9)	0.00	33.33	33.33	11.11	22.22
Suburban (n=153)	1.31	62.75	20.92	1.11	3.92
Rural (n=59)	3.39	64.41	28.81	1.69	1.69

Figure 26. Response percentages, by geographic region, to Question 23: Apply mathematical concepts discussed in class to everyday life.

Care should be used when interpreting these data because of the small urban sample.

No significant relationship was found between responses to this question and participation in the pilot assessment.

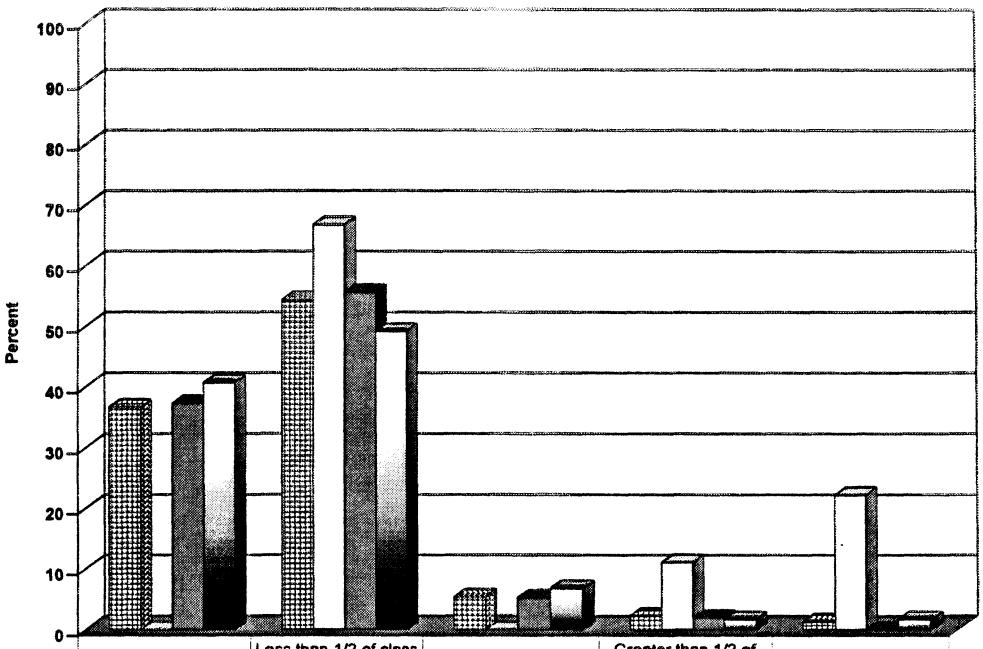
Question 24 assessed how often teachers asked their students to read about class content from sources other than a textbook during a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 12.08$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of 4th- and 8th-grade teachers and responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 8th- and 10th-grade teachers. Figure 27 displays the summary data for this question.



	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=221)	36.56	54.30	5.43	2.26	1.36
Grade 4 (n=106)	17.92	68.87	7.55	3.77	1.89
Grade 8 (n=46)	45.65	50.00	4.35	0.00	0.00
Grade 10 (n=697)	59.42	34.78	2.90	1.45	1.45

Figure 27. Response percentages, by grade, to Question 24: Read about class content from sources other than textbook.

Question 24 also showed a significant difference for geographic region, $F(2, 214) = 10.70$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There was no significant difference between responses of suburban and rural teachers. Figure 28 reveals summary data for this question.



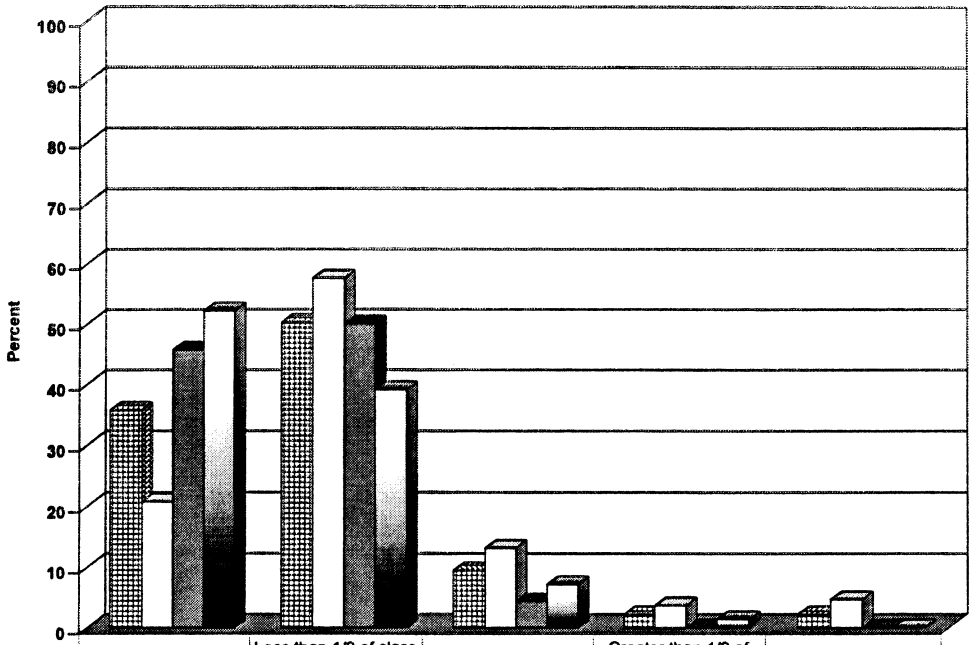
	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=221)	36.65	54.30	5.43	2.26	1.36
Urban (n=9)	0.00	66.67	0.00	11.11	22.22
Suburban (n=153)	37.25	55.56	5.23	1.96	0.00
Rural (n=59)	40.68	49.15	6.78	1.69	1.69

Figure 28. Response percentages, by geographic region, to Question 24: Read about class content from sources other than textbook.

Care should be used when interpreting these data because of the small urban sample.

No significant relationship was found between responses to this question and participation in the pilot assessment.

Question 25 asked teachers how often they require students to write about class content during a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 13.12$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of 4th- and 8th-grade teachers and the responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 8th- and 10th-grade teachers. Summary data can be found in Figure 29.

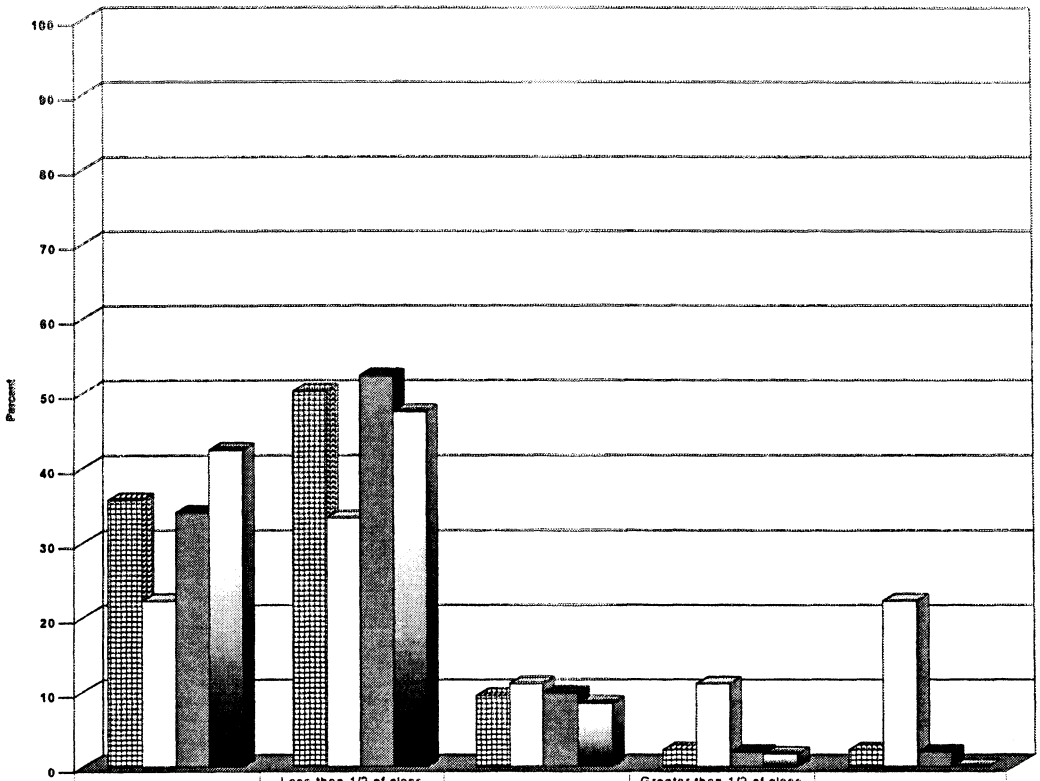


	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost All
Total Sample (N=221)	35.75	50.23	9.50	2.26	2.26
Grade 4 (n=106)	20.75	57.55	13.21	3.77	4.72
Grade 8 (n=46)	45.65	50.00	4.35	0.00	0.00
Grade 10 (n=69)	52.17	39.13	7.25	1.45	0.00

Figure 29. Response percentages, by grade, to Question 25: Write about class content.

Students in the 4th grade are more likely than those in 8th and 10th grade to write about class content in class.

Question 25 also showed a significant difference for geographic region, $F(2, 214) = 6.44$; $p < 0.0019$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There was no significant difference between responses of suburban and rural teachers. Figure 30 reveals summary data for this question.



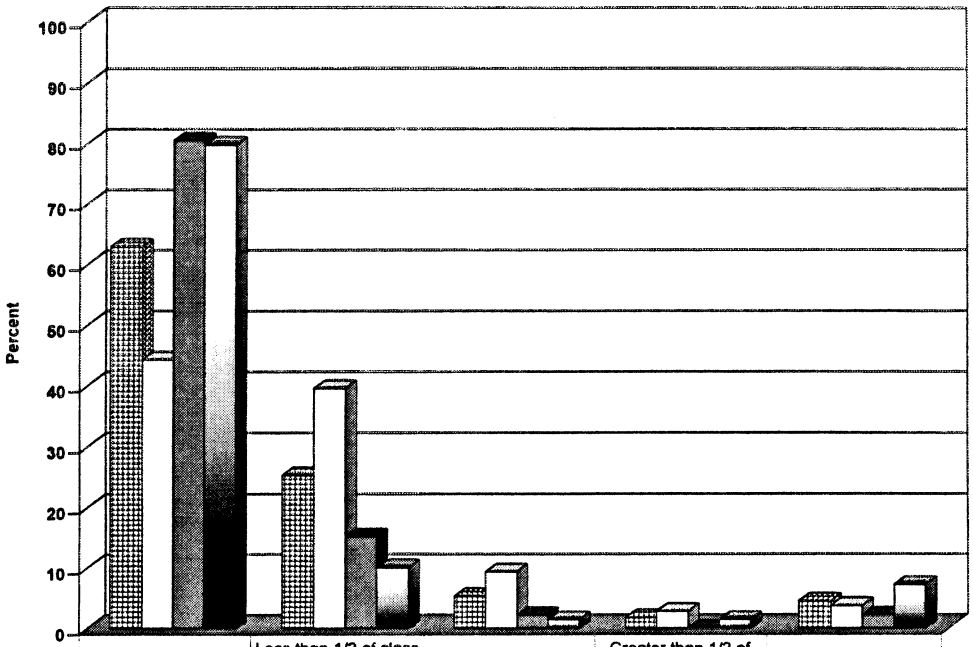
	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=221)	35.75	50.23	9.50	2.26	2.26
Urban (n=9)	22.22	33.33	11.11	11.11	22.22
Suburban (n=153)	33.99	52.29	9.80	1.96	1.96
Rural (n=59)	42.37	47.46	8.47	1.69	0.00

Figure 30. Response percentages, by geographic region, to Question 25: Write about class content.

Care should be taken when interpreting this statistic because of the small urban sample.

No significant relationship was found between responses to this question and participation in the pilot assessment.

Question 26 asked teachers to indicate how much time the students spend keeping a journal in class. Analysis revealed a significant difference for grade, $F(2, 214) = 5.31$; $p < 0.0056$. Post-hoc Scheffé analysis showed that responses of 4th- and 8th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 10th-grade teachers, or between responses of 8th- and 10th-grade teachers. Summary data can be found in Figure 31.

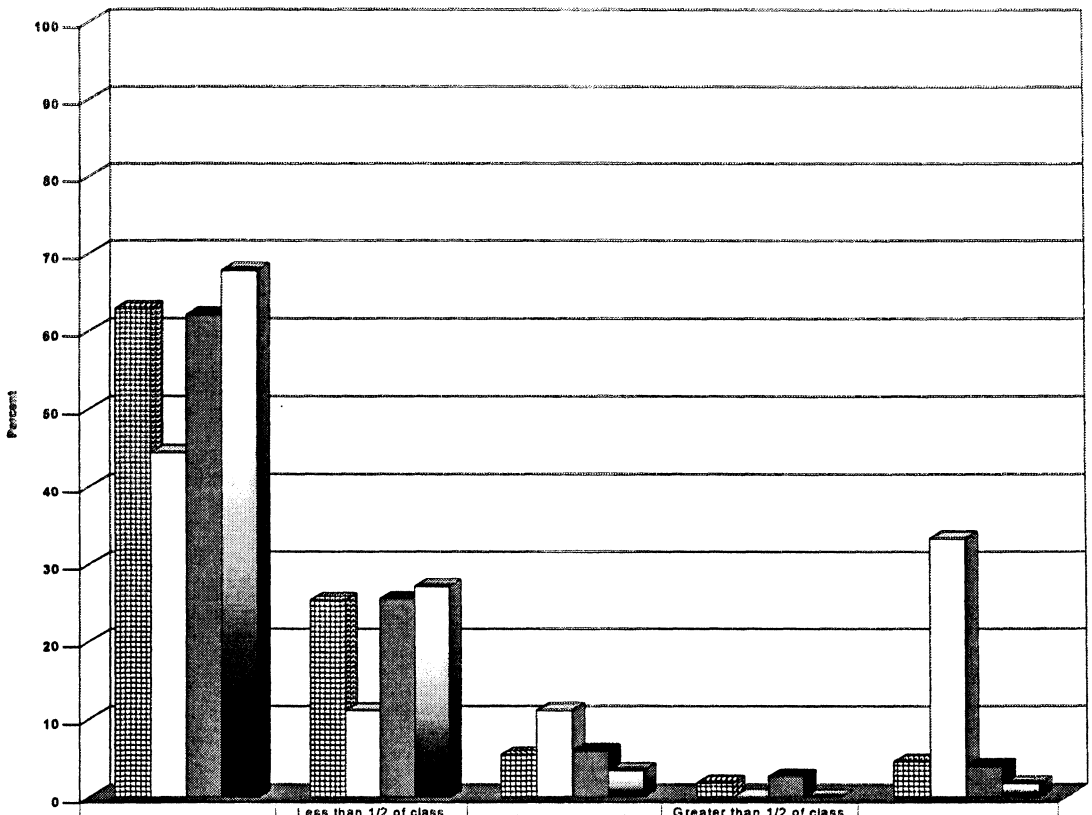


	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost All
Total Sample (N=221)	62.90	25.34	5.43	1.81	4.52
Grade 4 (n=106)	44.34	39.62	9.43	2.83	3.77
Grade 8 (n=46)	80.43	15.22	2.17	0.00	2.17
Grade 10 (n=69)	79.71	10.14	1.45	1.45	7.25

Figure 31. Response percentages, by grade, to Question 26: Keep a journal.

For the total sample, 63% of teachers indicate that their students never keep a math journal. Additionally, 8th- and 10th-grade students are far less likely to keep a journal than are 4th-graders.

Question 26 also showed a significant difference for geographic region, $F(2, 214) = 6.33$; $p < 0.0021$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There was no significant difference between responses of suburban and rural teachers. Figure 32 reveals summary data for this question.



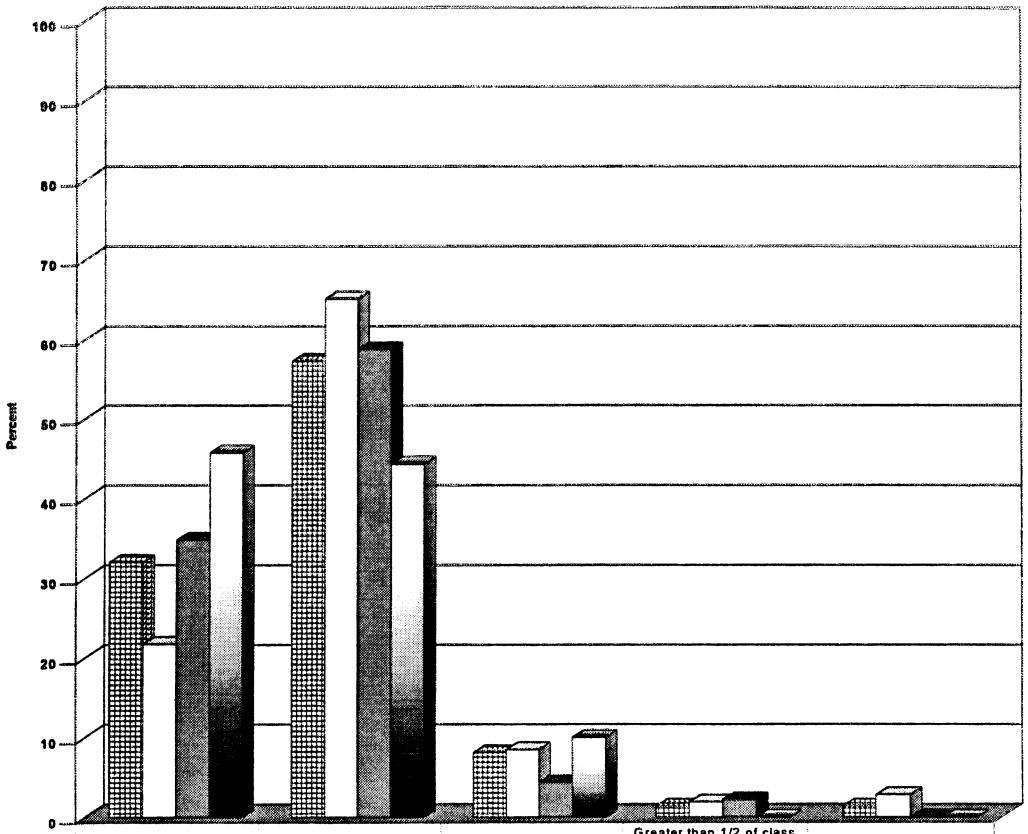
	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=221)	62.90	25.34	5.43	1.81	4.52
Urban (n=9)	44.44	11.11	11.11	0.00	33.33
Suburban (n=153)	62.09	25.49	5.88	2.61	3.92
Rural (n=59)	67.80	27.12	3.39	0.00	1.69

Figure 32. Response percentages, by geographic region, to Question 26: Keep a journal.

Care should be taken when interpreting this statistic because of the small urban sample.

No significant relationship was found between responses to this question and participation in the pilot assessment.

Question 27 required teachers to indicate the amount of class time their students spent on peer review during a typical class period. Analysis revealed a significant difference for grade, $F(2, 214) = 5.11$; $p < 0.0068$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers. Summary data can be found in Figure 33.

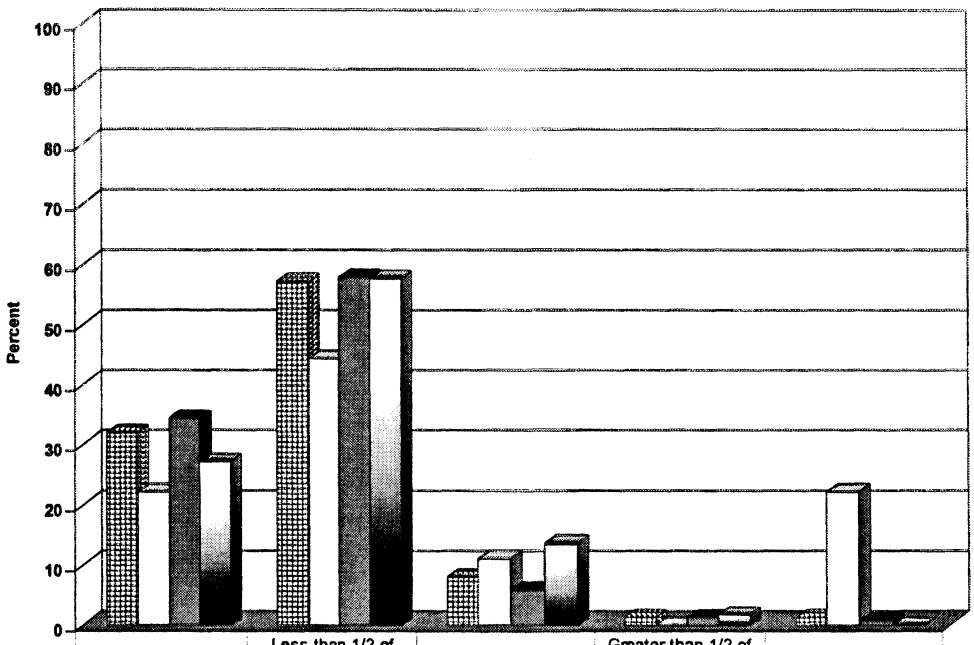


	Never	Less than 1/2 of class time	1/2 of class time	Greater than 1/2 of class time	Almost All
Total Sample (N=222)	31.98	57.21	8.11	1.35	1.35
Grade 4 (n=106)	21.70	65.09	8.49	1.89	2.83
Grade 8 (n=46)	34.78	58.70	4.35	2.17	0.00
Grade 10 (n=70)	45.71	44.29	10.00	0.00	0.00

Figure 33. Response percentages, by grade, to Question 27: Peer review.

At the 4th-grade level, students were more likely to engage in peer review in class than 10th-grade students. Forty-five percent (45%) of 10th-grade teachers report never doing peer review in class.

Question 27 also showed a significant difference for geographic region, $F(2, 214) = 5.62$; $p < 0.0042$. Post-hoc Scheffé analysis showed that responses of urban and suburban teachers and responses of urban and rural teachers were significantly different ($p < .05$). There was no significant difference between responses of suburban and rural teachers. Figure 34 reveals summary data for this question.



	Never	Less than 1/2 of class period	1/2 of class period	Greater than 1/2 of class period	Almost all
Total Sample (N=222)	31.98	57.21	8.11	1.35	1.35
Urban (n=9)	22.22	44.44	11.11	0.00	22.22
Suburban (n=154)	34.42	57.79	5.84	1.30	0.65
Rural (n=59)	27.12	57.63	13.56	1.69	0.00

Figure 34. Responses percentages, by geographic region, to Question 27: Peer review.

Care should be exercised when interpreting this statistic because of the small urban sample.

No significant relationship was found between responses to this question and participation in the pilot assessment.

Instructional Practices Factor Analysis

Introduction

Questions 11 through 27 asked teachers to estimate the frequency that students engage in the following activities in a typical class period:

Q11: Listen to the teacher explain something.
Q12: Read from a textbook.
Q13: Maintain a portfolio of his/her own work.
Q14: Work in pairs or small groups.
Q15: Use the computer.
Q16: Answer questions from a textbook or worksheet.
Q17: Take a quiz or test.
Q18: Take part in whole class discussion.
Q19: Ask questions to improve understanding.
Q20: Make predictions, guesses, or hypotheses.
Q21: Make maps, drawings, or models to show ideas.
Q22: Score or grade his/her own work using a scoring guide or rubric.
Q23: Apply concepts discussed in class to everyday life.
Q24: Read about class content from sources other than textbook.
Q25: Write about class content.
Q26: Keep a journal.
Q27: Peer review.

The following Likert scale was used:

1 = Never 2 = Less than 1/2 of class period 3 = 1/2 of class period 4 = Greater than 1/2 of class period 5 = Almost all

Teacher response percentages are reported by question in Table 11.

Table 11. Response percentages, for total sample, to Questions 11 through 27.

	Never	< 1/2 class	1/2 class	> 1/2 class	Almost all	
Question	1	2	3	4	5	n
11	0.0	50.5	31.5	9.5	8.6	222
12	21.6	71.2	3.6	1.8	1.8	222
13	49.7	37.7	3.6	2.3	7.3	220
14	3.2	50.0	33.3	10.8	2.7	222
15	48.2	47.7	2.7	0.9	0.5	222
16	0.5	51.8	24.3	17.6	5.9	222
17	0.5	71.2	12.8	7.3	8.2	219
18	0.5	55.9	29.7	9.0	5.0	222
19	0.5	47.3	29.3	13.5	9.5	222
20	3.2	63.5	22.5	8.1	2.7	222
21	8.6	63.5	20.7	4.5	2.7	222
22	31.1	56.3	9.0	1.8	1.8	222
23	1.8	62.0	23.5	8.6	4.1	221
24	36.7	54.3	5.4	2.3	1.4	221
25	35.7	50.2	9.5	2.3	2.3	221
26	62.9	25.3	5.4	1.8	4.5	221
27	32.0	57.2	8.1	1.4	1.4	222

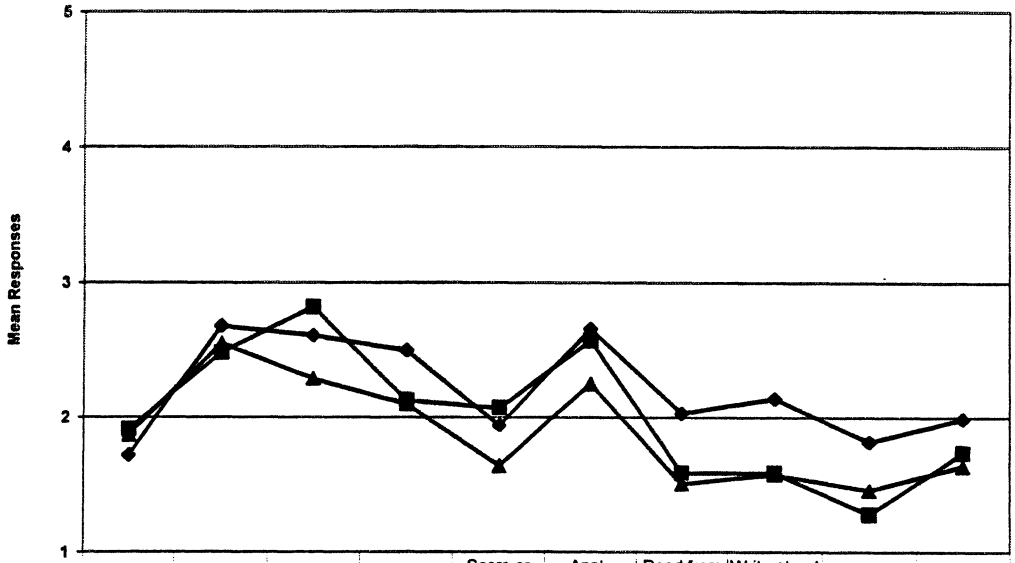
Analysis of Instructional Practices

Items in this section were factor analyzed to determine possible connections among these instructional practices. Based on the factor analysis, items clustered into "student-centered instruction" and "teacher-centered instruction." These clustered items were then analyzed for potential differences among the categorical variables. Statistically significant results are reported below in Figures 35 through 37.

Student-centered Instruction. Multivariate significance was found for the item and grade (Wilks' Lambda $F(20, 416) = 3.7775$, $p = .0001$). The graph of the interaction is presented in Figure 35.

Q13: Maintain a portfolio of his/her own work.
Q14: Work in pairs or small groups.
Q20: Make predictions, guesses, or hypotheses.
Q21: Make maps, drawings, or models to show ideas.
Q22: Score or grade his/her own work using a scoring guide or rubric.
Q23: Apply concepts discussed in class to everyday life.
Q24: Read about class content from sources other than textbook.
Q25: Write about class content.
Q26: Keep a journal.
Q27: Peer review.

1 = Never 2 = Less than 1/2 of class period 3 = 1/2 of class period 4 = Greater than 1/2 of class period 5 = Almost all



	Maintain portfolio	Work in pairs	Make predictions	Make maps or drawings	Score or grade own work	Apply concepts to life	Read from other than text	Write about class content	Keep a journal	Peer review
Grade 4 (n=106)	1.72	2.68	2.61	2.50	1.94	2.66	2.03	2.14	1.82	1.99
Grade 8 (n=46)	1.91	2.48	2.82	2.13	2.07	2.57	1.59	1.59	1.28	1.74
Grade 10 (n=70)	1.87	2.55	2.29	2.10	1.64	2.25	1.51	1.58	1.46	1.64

Student-centered Instruction

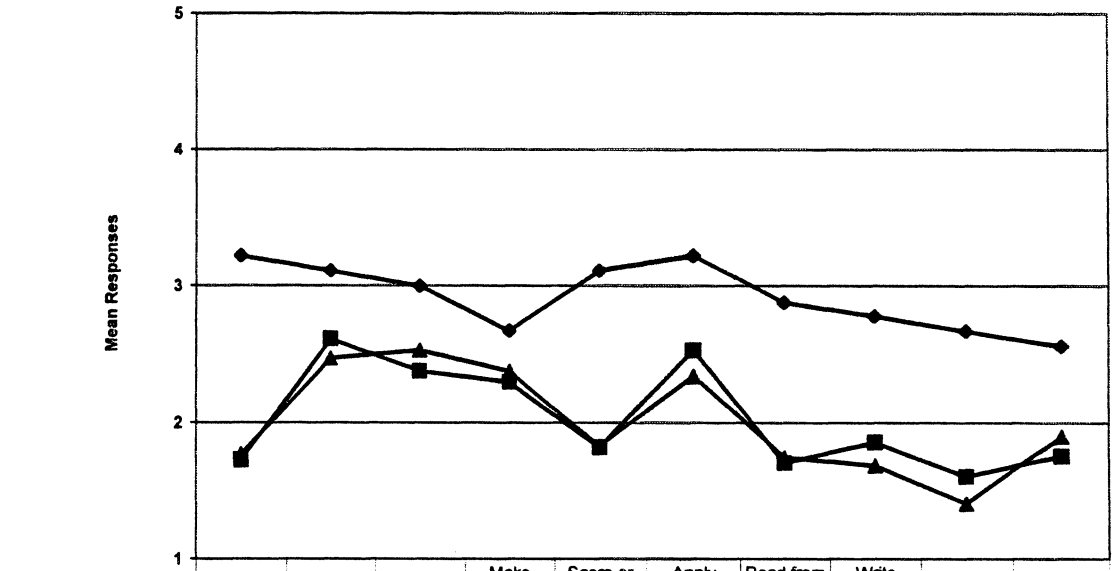
Figure 35. Mean responses for Questions 13, 14, 20, 21, 22, 23, 24, 25, 26, and 27, by grade.

All questions except for the first two showed significant differences by grade, and Tukey's HSD ($p < .05$) was used to determine the significant pairs. Question 20 (Making predictions), $F(2, 217)=4.61$, showed that 4th-grade teachers report a greater level of activity than 10th-grade teachers do. In Question 21 (Making maps or drawings), $F(2, 217)=6.62$, we noted that 4th-grade teachers report engaging in this activity significantly more than their 8th- and 10th-grade colleagues. Question 22 (Students using scoring guides or rubrics to grade their own work), $F(2, 217)=5.02$, revealed significant differences between the 4th- and 8th-grade teachers and the 10th-grade teachers, with the latter using this technique less often. Question 23 (Application of problems to everyday life), $F(2, 217)=5.29$, revealed that the 10th-grade teachers

engage in this activity significantly less than the 4th-grade teachers do. Question 24 (Reading about class content from sources other than a textbook), $F(2, 217)=12.54$, indicated that 4th-grade teachers are more likely to use this technique than either 8th- or 10th-grade teachers. In Question 25, $F(2, 217)=13.09$, our analysis suggested that 4th-grade teachers are also significantly more likely to have their students write about class content in class than 8th- and 10th-grade teachers. In the last two questions, we found that 4th-grade teachers report having their students keep journals significantly more than 8th-grade teachers, Question 26, $F(2, 217)=5.66$, and that they are also significantly more likely to do peer review in class than 10th-grade teachers, Question 27, $F(2, 217)=5.28$.

Multivariate significance was also found for the item and geographic region (Wilks' Lambda $F(20, 416) = 3.0534$, $p = .0001$). The graph of the interaction is presented in Figure 36.

1 = Never 2 = Less than 1/2 of class period 3 = 1/2 of class period 4 = Greater than 1/2 of class period 5 = Almost all



	Maintain portfolio	Work in pairs	Make predictions	Make maps or drawings	Score or grade own work	Apply concepts to life	Read from other than text	Write about class	Keep a journal	Peer review
Urban (n=9)	3.22	3.11	3.00	2.67	3.11	3.22	2.88	2.78	2.67	2.56
Suburban (n=152)	1.73	2.61	2.38	2.30	1.82	2.53	1.71	1.86	1.61	1.76
Rural (n=59)	1.77	2.47	2.53	2.38	1.83	2.34	1.75	1.69	1.41	1.9

Student-centered Instruction

Figure 36. Mean responses for Questions 13, 14, 20, 21, 22, 23, 24, 25, 26, and 27, by geographic region.

Urban teachers report that their students are engaging in these activities with more frequency than the suburban or rural teachers, but the small sample size must be taken into consideration when drawing conclusions from these data.

Teacher-centered Instruction. Based on the factor analysis, four items were removed for multivariate analysis. Multivariate significance was found for the item and grade (Wilks' Lambda $F(8, 432) = 2.2071$, $p = .0260$). The graph of the interaction is presented in Figure 37.

Q11: Listen to the teacher explain something.
Q16: Answer questions from a textbook or worksheet.
Q18: Take part in whole class discussion.
Q19: Ask questions to improve understanding.

1 = Never 2 = Less than 1/2 of class period 3 = 1/2 of class period 4 = Greater than 1/2 of class period 5 = Almost all

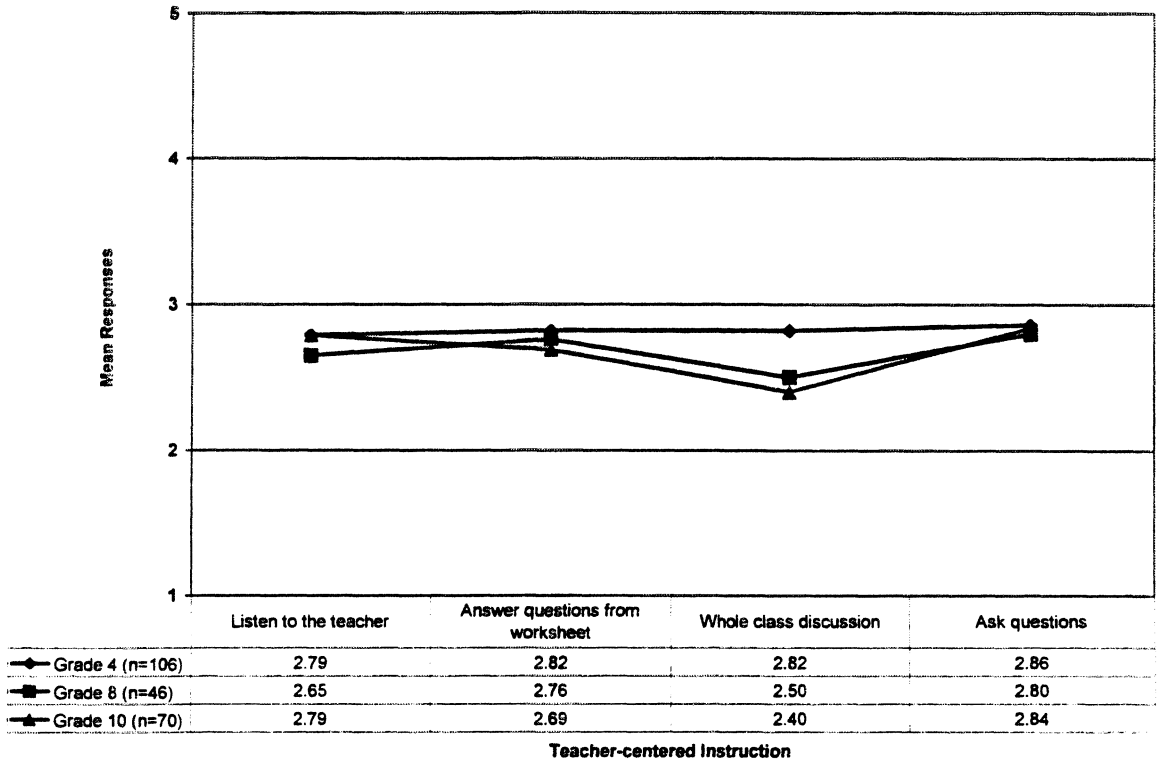


Figure 37. Mean responses for Questions 11, 16, 18, and 19, by grade.

Only Question 18 (Take part in whole-class discussion) showed individual significance, $F(2, 219)=6.00$, and Tukey's HSD revealed that 4th-grade teachers engage in this practice more than 10th-grade teachers.

Importance of Grading Procedures

Introduction

Questions 28 through 38 listed various types of assessment strategies used by teachers to ascertain levels of student performance. For each question, teachers were asked to "Indicate the relative importance you give to each of the following in determining grades for students," using a Likert scale that ranges from 1 (Not important) to 5 (Important). Summary data of the responses to these questions for the entire teacher sample, as well as these data broken down by grade (4th, 8th, and 10th grade), geographic region (urban, suburban, and rural), and participation in the 1997 pilot assessment (pilot and non-pilot), can be found in Appendix B. Table 12 reports percentage responses for the total sample in each of these areas.

Q28: Objective tests (e.g., multiple choice, true/false).
Q29: Essay tests.
Q30: Performance tasks or events.
Q31: Observation of student behavior.
Q32: Individual projects.
Q33: Group projects.
Q34: Homework assignments.
Q35: Portfolios.
Q36: Completion of written worksheets.
Q37: Individual seatwork.
Q38: Peer review.

Table 12. Response percentages, for total sample, to Questions 28 through 38.

Question	1	2	3	4	5	n
28	12.6	17.1	16.2	32.4	21.6	222
29	25.2	15.3	19.8	31.5	8.1	222
30	0.9	5.0	10.8	48.2	35.1	222
31	8.6	12.6	20.7	35.1	23.0	222
32	10.9	12.2	19.0	42.1	15.8	221
33	13.5	14.9	25.7	35.6	10.4	222
34	2.7	5.4	11.3	55.0	25.7	222
35	30.6	13.1	27.9	22.1	6.3	222
36	2.3	7.7	19.8	48.2	22.1	222
37	2.3	9.0	17.1	50.9	20.7	222
38	26.1	19.8	26.1	23.9	4.1	222

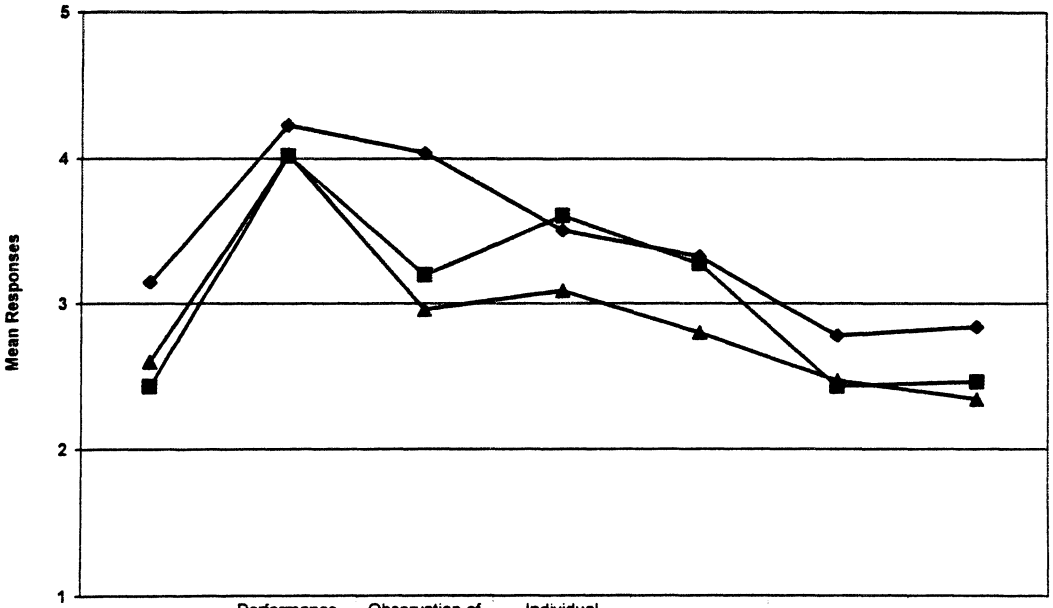
Analysis of Grading Procedures

Items in this section were factor analyzed to determine possible connections among these grading procedures. Based on this analysis, items appeared to cluster into "performance assessments" and "traditional assessments." These clustered items were then analyzed for potential differences among the categorical variables. Statistically significant results are reported below in Figures 38 through 40.

Performance Assessment Items. Multivariate significance was found for the item and grade (Wilks' Lambda $F(14, 424) = 3.9435$, $p = .0001$). The graph of the interaction is presented in Figure 38.

Q29: Essay tests.
Q30: Performance tasks or events.
Q31: Observation of student behavior.
Q32: Individual projects.
Q33: Group projects.
Q35: Portfolios.
Q38: Peer review.

1 = Not important 2 = Somewhat not important 3 = Neutral 4 = Somewhat important 5 = Very important



	Essay tests	Performance tasks or events	Observation of student behavior	Individual projects	Group projects	Portfolios	Peer review
Grade 4 (n=106)	3.15	4.23	4.04	3.51	3.33	2.78	2.84
Grade 8 (n=46)	2.43	4.02	3.20	3.61	3.28	2.43	2.46
Grade 10 (n=70)	2.60	4.03	2.96	3.09	2.80	2.47	2.34

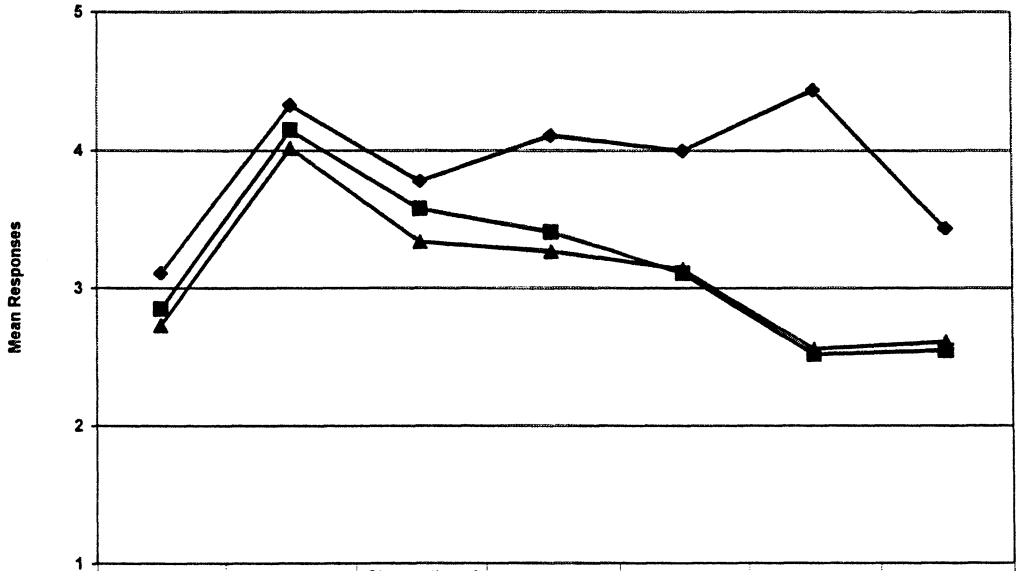
Performance Assessment Items

Figure 38. Mean responses for Questions 29, 30, 31, 32, 33, 35, and 38, by grade.

Five of these seven items displayed individual significance; Tukey's HSD ($p < .05$) revealed significant pairs in four. In Question 29 (Essay tests), $F(2, 218)=6.46$, we found that 4th-grade teachers consider this technique significantly more important than either their 8th- or 10th-grade colleagues. This was also the case for Question 31 (Observation of student behavior), $F(2, 218)=22.29$. Question 32 (Individual projects) was significant overall, $F(2, 218)=3.61$, but showed no significant pairs. Question 33 (Group projects), $F(2, 218)=4.66$, indicated that 10th-grade teachers feel this strategy is significantly less useful than do 4th-grade teachers. Finally, we found in Question 38 (Peer review) that 4th-grade teachers are significantly more likely to consider this technique important than 10th-grade teachers.

Multivariate significance was also found for the item and geographic region (Wilks' Lambda $F(14, 424) = 1.7892$, $p = .0379$). The graph of the interaction is presented in Figure 39.

1 = Not important 2 = Somewhat not important 3 = Neutral 4 = Somewhat important 5 = Very important



	Essay tests	Performance tasks or events	Observation of student behavior	Individual projects	Group projects	Portfolios	Peer review
Urban (n=9)	3.11	4.33	3.78	4.11	4.00	4.44	3.44
Suburban (n=153)	2.85	4.15	3.58	3.41	3.11	2.52	2.55
Rural (n=59)	2.73	4.02	3.34	3.27	3.14	2.56	2.61

Performance Assessment Items

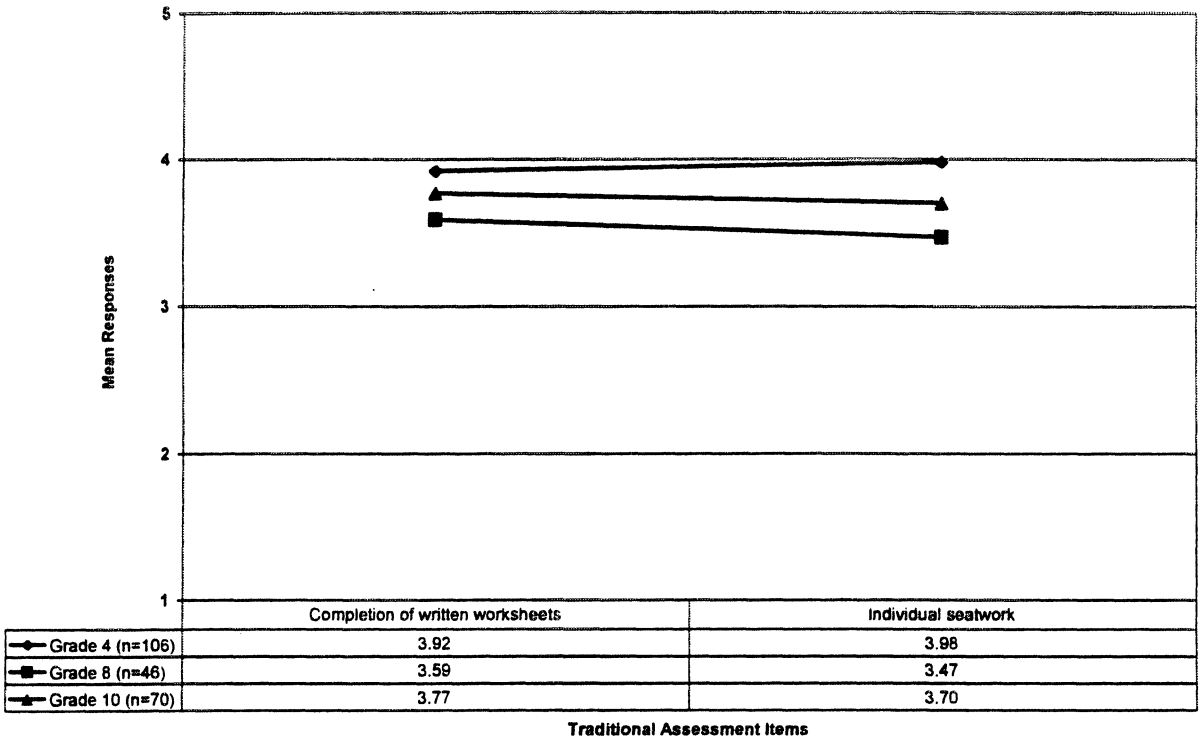
Figure 39. Mean responses for Questions 29, 30, 31, 32, 33, 35, and 38, by geographic region.

Care should be used when interpreting these data because of the small urban sample.

Traditional Assessment Items. Based on the factor analysis, two items were removed for multivariate analysis. Multivariate significance was found for the item and grade (Wilks' Lambda $F(4, 436) = 2.5738$, $p = .0372$). The graph of the interaction is presented in Figure 40.

Q36: Completion of written worksheets.
Q37: Individual seatwork.

1 = Not important 2 = Somewhat not important 3 = Neutral 4 = Somewhat important 5 = Very important



	Completion of written worksheets	Individual seatwork
Grade 4 (n=106)	3.92	3.98
Grade 8 (n=46)	3.59	3.47
Grade 10 (n=70)	3.77	3.70

Figure 40. Mean responses for Questions 36 and 37, by grade.

As indicated in the graph, 4th-grade teachers show the most emphasis on these two areas, followed by 10th-grade teachers and then 8th-grade teachers. Only Question 37 (Individual seatwork) showed significant differences, $F(2, 219)=5.13$, and Tukey's HSD indicated that 4th-grade teachers believe this technique is more important than 8th-grade teachers do.

Influence of Teacher Preparation

Introduction

Questions 39 through 49 asked teachers to indicate how well prepared they were to perform various activities. For each question, teachers were asked, "Indicate how well prepared you are to perform the following activities," using a Likert-scale that ranges from 1 (Not well prepared) to 5 (Very well prepared). Summary data of the responses to these questions for the entire teacher sample, as well as these data broken down by grade (4th, 8th, and 10th grade), geographic region (urban, suburban, and rural), and participation in the 1997 pilot assessment (pilot and non-pilot), can be found in Appendix B. Table 13 reports percentage responses for the total sample in each of these areas

Q39: Use cooperative learning groups.
Q40: Use computers as an integral part of instruction.
Q41: Integrate this subject with other subject areas.
Q42: Use a variety of assessment strategies.
Q43: Help students document and evaluate their work through portfolios.
Q44: Teach groups that vary in ability.
Q45: Teach students from a variety of cultural backgrounds.
Q46: Teach students who have limited English proficiency.
Q47: Teach students who have learning disabilities.
Q48: Encourage participation of females.
Q49: Involve parents in the education of their children.

Table 13. Response percentages, for total sample, to Questions 39 through 49.

Question	1	2	3	4	5	n
39	2.3	13.6	29.9	32.6	21.7	221
40	23.0	30.2	22.5	17.6	6.8	222
41	5.4	25.2	30.6	26.6	12.2	222
42	0.5	21.6	31.1	34.2	12.6	222
43	34.7	31.1	19.4	10.8	4.1	222
44	4.5	11.3	32.0	31.1	21.2	222
45	14.0	18.9	27.5	26.1	13.5	222
46	45.9	26.1	15.8	10.4	1.8	222
47	7.2	23.9	27.5	26.1	15.3	222
48	0.5	2.3	15.8	40.1	41.4	222
49	2.7	10.4	34.2	33.3	19.4	222

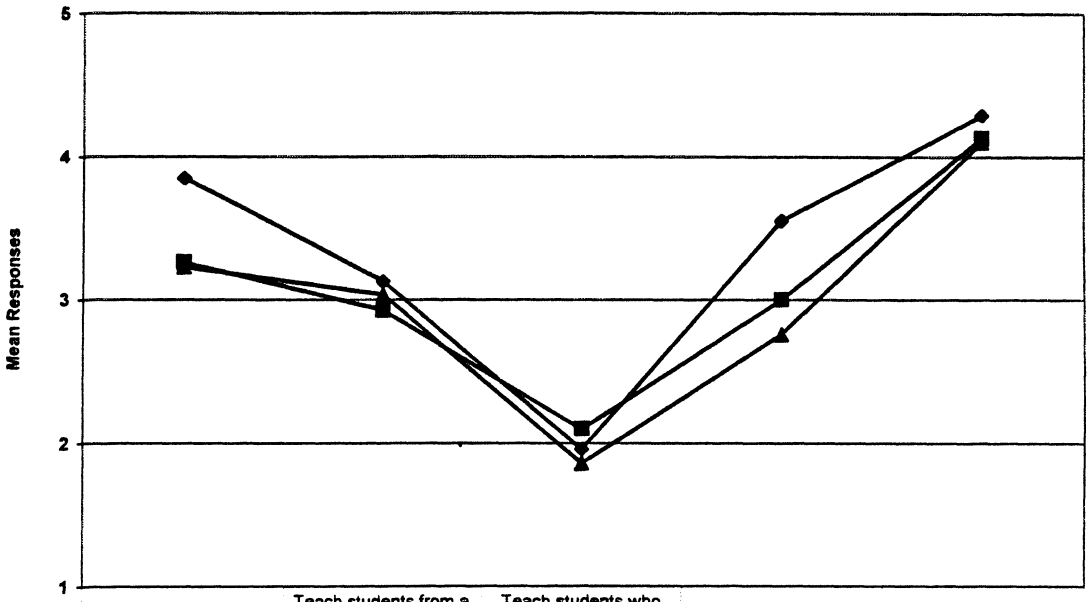
Analysis of Teacher Preparation

Items in this section were factor analyzed to determine possible connections among these aspects of teacher preparedness. Based on this analysis, items clustered into "preparation for teaching to individual differences" and "preparation for teaching with innovative methods." These clustered items were then analyzed for potential differences among the categorical variables. Statistically significant results are reported in Figures 41 through 43.

Preparation for Teaching to Individual Differences. Based on the factor analysis, five items were removed for multivariate analysis. Multivariate significance was found for the item and grade (Wilks' Lambda $F(10, 430) = 4.0616$, $p = .0001$). The graph of the interaction is presented in Figure 41.

Q44: Teach groups that vary in ability.
Q45: Teach students from a variety of cultural backgrounds.
Q46: Teach students who have limited English proficiency.
Q47: Teach students who have learning disabilities.
Q48: Encourage participation of females.

1 = Not well prepared 2 = Somewhat prepared 3 = Prepared 4 = Well prepared 5 = Very well prepared



	Teach groups that vary in ability	Teach students from a variety of cultural backgrounds	Teach students who have limited English proficiency	Teach students who have learning disabilities	Encourage participation of females
Grade 4 (n=106)	3.85	3.13	1.96	3.55	4.29
Grade 8 (n=46)	3.26	2.93	2.10	3.00	4.13
Grade 10 (n=70)	3.23	3.04	1.86	2.76	4.10

Preparation for Teaching to Individual Differences

Figure 41. Mean response for Questions 44, 45, 46, 47, and 48, by grade.

Two questions showed individual significance. In Question 44 (Preparedness to teach groups that vary in ability), $F(2, 219)=9.39$, Tukey's HSD indicated that 4th-grade teachers consider themselves significantly more prepared to teach such groups than 8th- and 10th-grade teachers. The same was true for Question 47, $F(2, 219)=11.26$, where the 4th-grade teachers also indicated a significantly greater preparedness to teach students with learning disabilities than their 8th- and 10th-grade colleagues.

Preparation for Teaching with Innovative Methods. Based on the factor analysis, four items were removed for multivariate analysis. Multivariate significance was found for the item and grade (Wilks' Lambda $F(8, 432) = 4.3864$, $p = .0001$). The graph of the interaction is presented in Figure 42.

Q40: Use computers as an integral part of instruction.
Q41: Integrate this subject with other subject areas.
Q42: Use a variety of assessment strategies.
Q43: Help students document and evaluate their work through portfolios.

1 = Not well prepared 2 = Somewhat prepared 3 = Prepared 4 = Well prepared 5 = Very well prepared

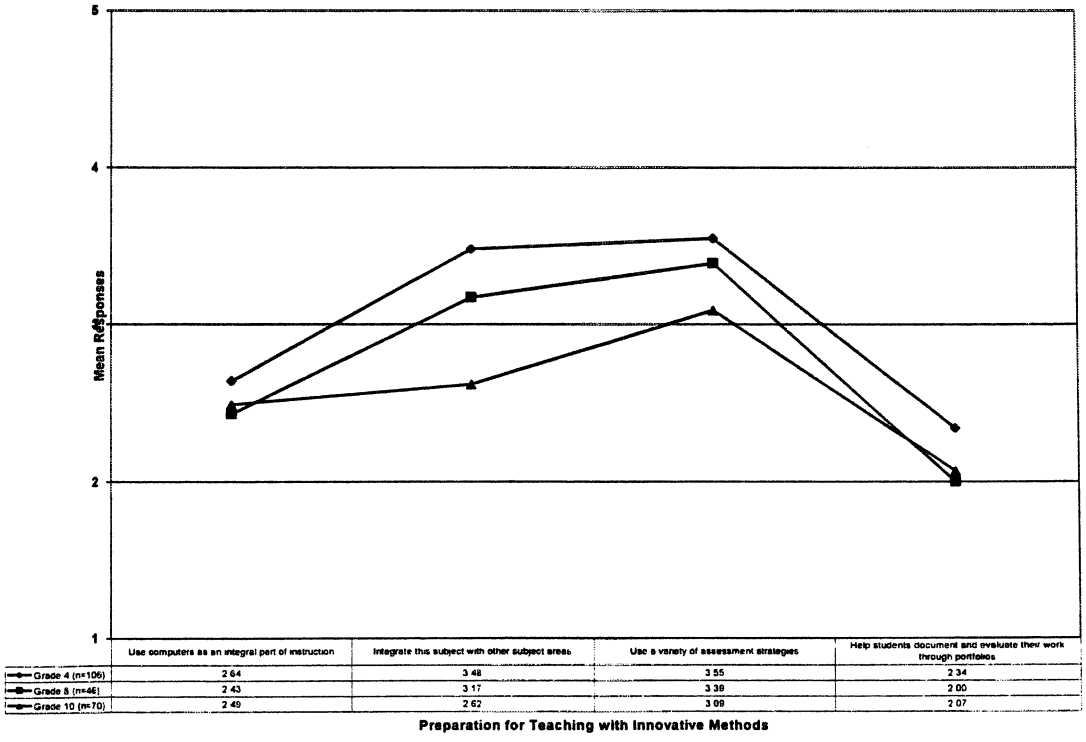


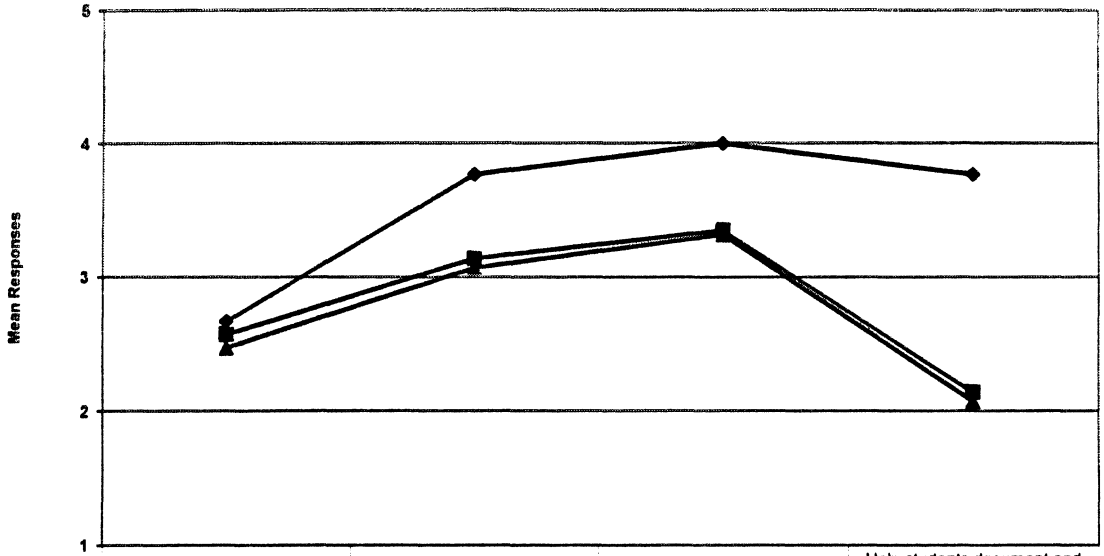
Figure 42. Mean responses to Questions 40, 41, 42, and 43, by grade.

Two questions showed individual significance. In Question 41 (Preparedness to integrate mathematics with other subject areas), $F(2, 219)=14.27$, Tukey's HSD indicated that 4th- and 8th-grade teachers consider themselves significantly more prepared than 10th-grade teachers. For

Question 42, $F(2, 219)=4.91$, the 4th-grade teachers indicated a significantly greater preparedness to use a variety of assessment strategies than their 10th-grade colleagues did.

Multivariate significance was also found for the item and geographic region (Wilks' Lambda $F(8, 432) = 2.6844$, $p = .0069$). The graph of the interaction is presented in Figure 43.

1 = Not well prepared 2 = Somewhat prepared 3 = Prepared 4 = Well prepared 5 = Very well prepared



	Use computers as an integral part of instruction	Integrate this subject with other subject areas	Use a variety of assessment strategies	Help students document and evaluate their work through portfolios
Urban (n=9)	2.67	3.77	4.00	3.77
Suburban (n=154)	2.57	3.14	3.35	2.14
Rural (n=59)	2.47	3.07	3.32	2.07

Preparation for Teaching with Innovative Methods

Figure 43. Mean responses to Questions 40, 41, 42, and 43, by geographic region.

Care should be used when interpreting these data because of the small urban sample.

Instructional Influences

Introduction

Questions 50 through 59 asked teachers to indicate which of the given items influenced course content. For each question, teachers were asked, "Indicate the degree to which each of the following influences the content you teach in this class," using a Likert scale that ranges from 1 (No influence) to 5 (Very strong influence). Summary data of the responses to these questions for the entire teacher sample, as well as these data broken down by grade (4th, 8th, and 10th grade), geographic region (urban, suburban, and rural), and participation in the 1997 pilot assessment (pilot and non-pilot), can be found in Appendix B. Table 14 reports percentage responses for the total sample in each of these areas.

Q50: Missouri's education curriculum framework or guidelines.
Q51: Your district's curriculum framework or guidelines.
Q52: Textbook.
Q53: Missouri's State Assessment Program.
Q54: Education standards or curriculum guidelines from national organizations.
Q55: Your understanding of what motivates your students.
Q56: Available equipment and supplies.
Q57: Student aptitude.
Q58: Practices of other teachers.
Q59: Parents.

Table 14. Response percentages, for total sample, to Questions 50 through 59.

Question	1	2	3	4	5	n
50	1.4	1.8	23.1	41.6	32.1	221
51	0.9	2.7	9.9	41.9	44.6	222
52	2.7	16.2	38.3	32.4	10.4	222
53	1.4	5.0	22.1	39.6	32.0	222
54	5.4	22.5	41.4	22.5	8.7	222
55	0.5	3.2	29.3	43.2	23.9	222
56	2.7	9.0	40.3	35.7	12.2	221
57	0.7	7.7	36.9	41.4	13.1	222
58	9.0	30.2	41.4	17.1	2.3	222
59	11.7	42.3	34.7	9.9	1.4	222

Analysis of Instructional Influences

Items in this section were factor analyzed to determine possible connections among these instructional influences. Based on this analysis, items appeared to cluster into "curricular guidelines and state assessment," and "teaching environment." These clustered items were then analyzed for potential difference among the categorical variables. Statistically significant results are reported below in Figures 44 and 45.

Curricular Guidelines and State Assessment. Based on the factor analysis, three items were removed for multivariate analysis. Multivariate significance was found for the item and grade, (Wilks' Lambda $F(6, 432) = 4.8443$, $p = .0001$). The graph of the interaction is presented in Figure 44.

Q50: Missouri's mathematics education curriculum framework or guidelines. Q51: Your district's curriculum framework or guidelines. Q53: Missouri's State Assessment Program.

The scale is 1 (No influence) to 5 (Very strong influence).

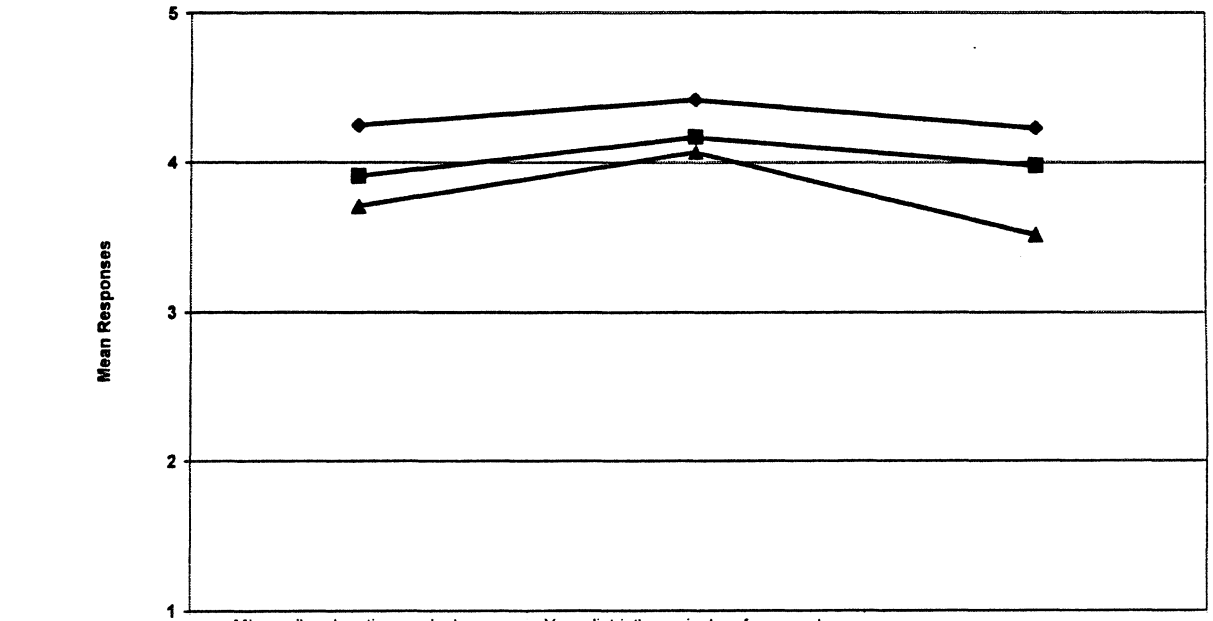


Figure 44. Mean responses for Questions 50, 51, and 53, by grade.

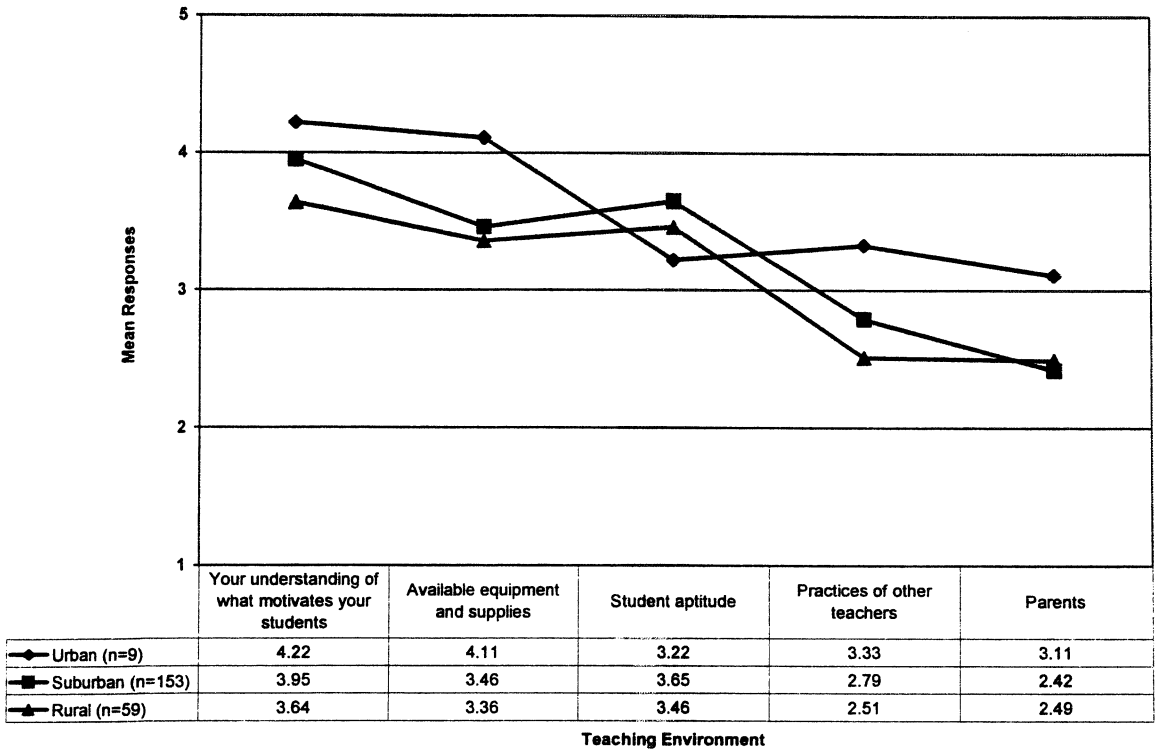
Overall, teachers indicate that the Missouri curriculum framework or guidelines, district curriculum framework or guidelines, and the Missouri State Assessment influence their

instruction, with the 4th-grade teachers influenced most and the 10th-grade teachers influenced least. These observations can be broken down by individual question. In Question 50, $F(2, 218)=9.31$, Tukey's HSD indicated that Missouri's mathematics educational curriculum framework or guidelines influences 4th-grade teachers to a greater, significant extent than 10th-grade teachers. For Question 51, $F(2, 218)=4.35$, Tukey's HSD suggested that 4th-grade teachers are influenced significantly more than 10th-grade teachers by district curriculum framework or guidelines. Finally, with respect to being influenced by Missouri's State Assessment Program, $F(2, 218)=13.43$, Tukey's HSD showed that both 4th- and 8th-grade teachers are significantly more influenced by it than 10th-grade teachers.

Teaching Environment. Based on the factor analysis, five items were removed for multivariate analysis. Multivariate significance was found for the item and geographic region (Wilks' Lambda $F(10,428) = 3.1732$, $p = .0006$). The graph of the interaction is presented in Figure 45.

Q55: Your understanding of what motivates your students.
Q56: Available equipment and supplies.
Q57: Student aptitude.
Q58: Practices of other teachers.
Q59: Parents.

The scale is 1 (No influence) to 5 (Very strong influence).



	Your understanding of what motivates your students	Available equipment and supplies	Student aptitude	Practices of other teachers	Parents
Urban (n=9)	4.22	4.11	3.22	3.33	3.11
Suburban (n=153)	3.95	3.46	3.65	2.79	2.42
Rural (n=59)	3.64	3.36	3.46	2.51	2.49

Figure 45. Mean responses to Questions 55, 56, 57, 58, and 59, by geographic region.

The influence of other teachers and parents are both reported below "moderate influence" for suburban and rural teachers. The divergences occur at available equipment and supplies, practices of other teachers, and parents. Care should be used when interpreting these data because of the small urban sample.

Multivariate significance was also found for the item and participation in the spring 1997 pilot (Wilks' Lambda $F(5,215) = 2.2691$, $p = .0488$). The graph of the interaction is presented in Figure 46.

Q55: Your understanding of what motivates your students.
Q56: Available equipment and supplies.
Q57: Student aptitude.
Q58: Practices of other teachers.
Q59: Parents.

The scale is 1 (No influence) to 5 (Very strong influence).

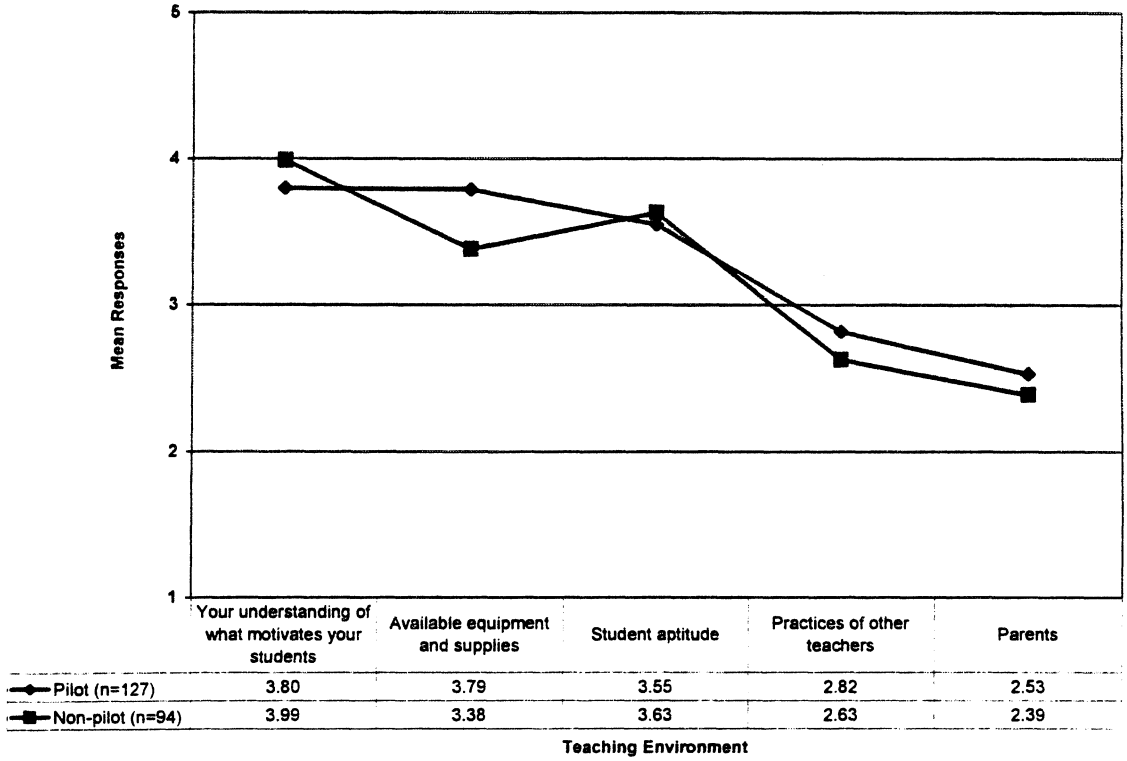


Figure 46. Mean responses to Questions 55, 56, 57, 58, and 59, by participation in the spring 1997 pilot.

Use of Computers and Technological Equipment

Introduction

With the adoption of the Show-Me Standards, technology and the ability to use technology was integrated in the guiding standards for the state of Missouri. Specifically, the Show-Me Standards address the use of technology in Goal 1 and Goal 2 of the standards.

Goal 1, Process Standard 4: Use technological tools and other resources to locate, select and organize information.

Goal 2, Process Standard 7: Use technological tools to exchange information and ideas.

The teacher survey addressed several issues related to technology, both in terms of availability and use. Responses to the items related to technology were based on a sample size of 222. Of these respondents, 128 were from schools that participated in the spring 1997 pilot and 94 were from schools that did not participate. Urban, suburban, and rural breakdowns were 9, 154 and 59 respondents respectively, and grade breakdowns were 106 4th-grade teachers, 46 8th-grade teachers and 70 10th-grade teachers.

Questions 60 through 63 and 111 through 114 of the survey were designed to collect information about technology availability and use in the classroom. For each question, teachers were asked to "Indicate the availability and approximate number of times per semester each of the following occurs with this class." Teachers were given a choice of five Likert-scale responses: 1 (Not available), 2 (Available, but not used), 3 (Used weekly), 4 (Used bimonthly), and 5 (Used monthly). Summary data of the responses to these questions for the entire teacher sample, as well as these data broken down by grade (4th, 8th, and 10th grade), geographic region (urban, suburban, and rural), and participation in the 1997 pilot assessment (pilot and non-pilot), can be found in Appendix B.

Q60: An overhead projector is used in instruction.
Q61: A videotape player is used in instruction.
Q62: A computer is used by you in instruction.
Q63: A computer is used by the students.
Q111: Calculators are used in instruction.
Q112: Graphing calculators are used in instruction.
Q113: Manipulatives are used in instruction.
Q114: Electronic technology is used for spreadsheets, making graphs, or analyzing data.

Table 15 reports percentage responses for types of technology used in the classroom.

Table 15. Response percentages, for total sample, to Questions 60–63 and 111–114.

	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly	n
Overhead projector	1.8	8.6	71.6	9.9	8.1	222
Videotape player	7.2	52.7	5.4	13.5	21.2	222
Computer used by instructor	24.3	36.0	18.5	5.6	12.6	222
Computer used by students	23.5	24.9	33.9	7.2	10.4	221
Calculator	3.2	5.9	59.3	13.6	18.1	221
Graphing calculator	57.1	13.2	16.0	5.0	8.7	219
Manipulatives	4.1	5.9	44.8	23.7	21.5	219
Spreadsheets, graphs, analyze data	39.09	35.91	4.09	8.18	12.73	220

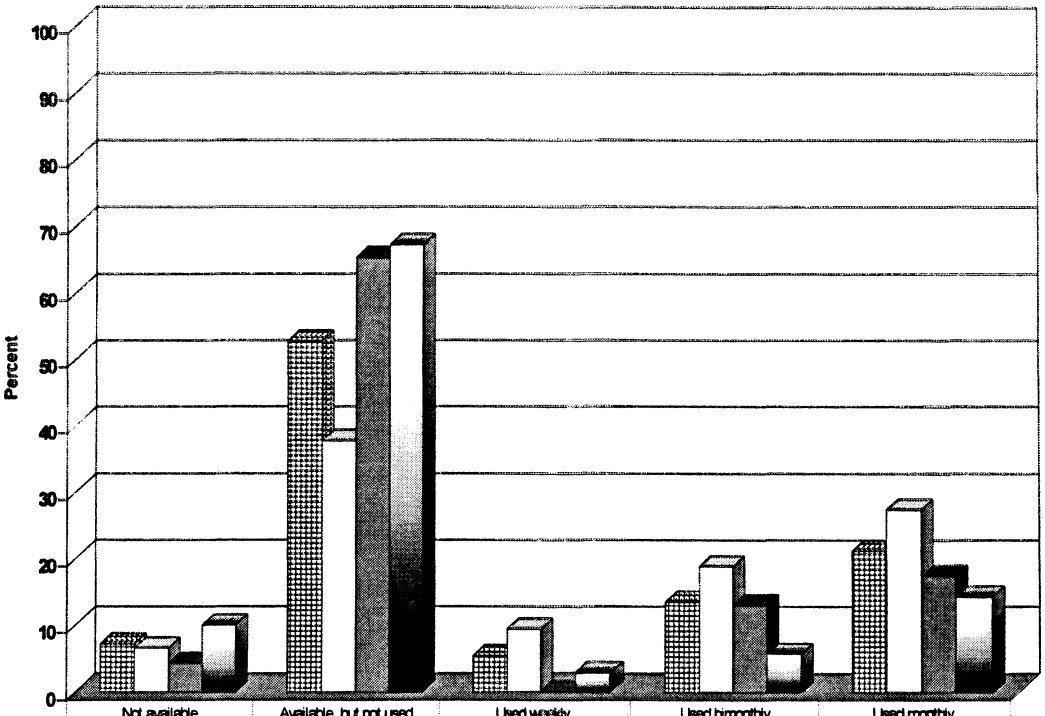
Analysis of Use of Computers and Technological Equipment

Results for Questions 60–63 were analyzed using one-way MANOVA, between-groups design. This analysis revealed a significant multivariate effect for grade, Wilks' Lambda $F(8, 430) = 2.93$; $p < 0.0034$.

Results for questions 111–114 were analyzed using one-way MANOVA, between-groups design. This analysis revealed a significant multivariate effect for grade, Wilks' Lambda $F(8, 426) = 20.64$; $p < 0.0001$. This analysis also revealed a significant multivariate effect for geographic region, Wilks' Lambda $F(8, 426) = 2.11$; $p < 0.0335$.

Individual items were analyzed using one-way ANOVA, between-groups design. For items that showed statistical significance by the categorical variables, the test results are reported in the following figures where the percent of teachers who responded to each choice on the Likert scale (1, 2, 3, 4, or 5) will be represented in graphical and tabular form. Items that were not statistically significant are not reported.

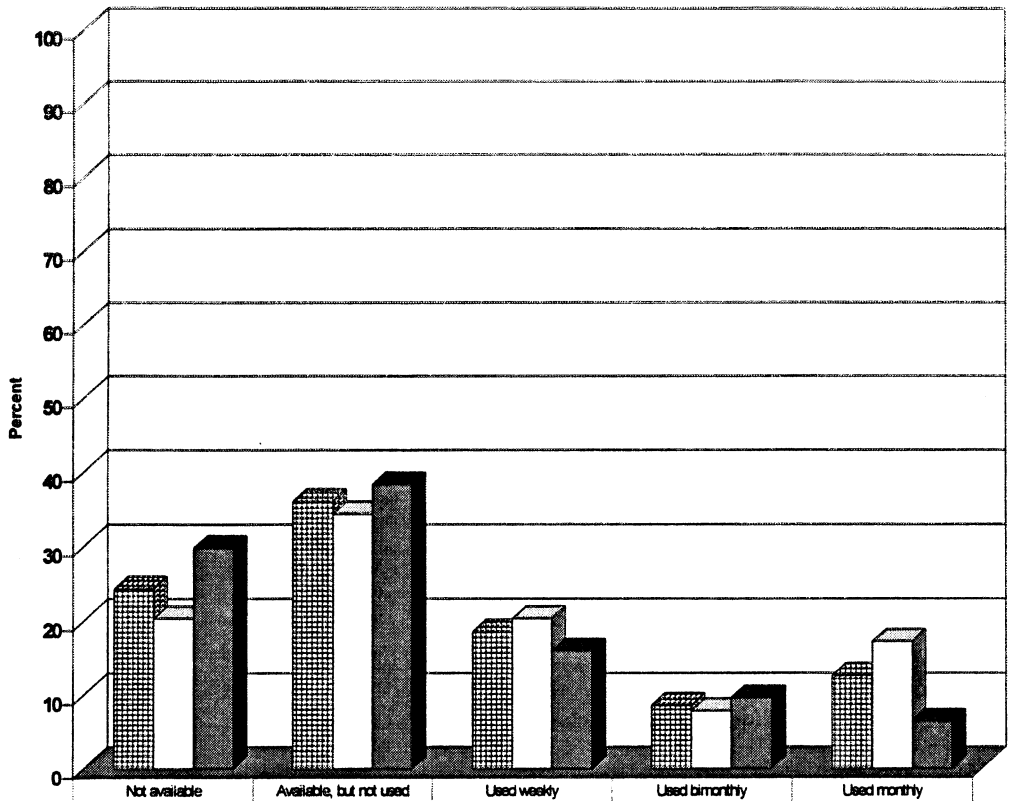
Question 61 asked teachers about the availability and use of videotape players in instruction. Analysis revealed a significant difference for grade, $F(2, 218) = 7.38$; $p < 0.0008$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between 8th- and 10th-grade teachers. Response percentages are displayed in Figure 47.



	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly
Total Sample (N=222)	7.21	52.7	5.41	13.51	21.17
Grade 4 (n=105)	6.60	37.74	9.43	18.87	27.36
Grade 8 (n=46)	4.35	65.22	0.00	13.04	17.39
Grade 10 (n=70)	10.00	67.14	2.86	5.71	14.29

Figure 47. Response percentages, by grade, to Question 61: Videotape player used in instruction.

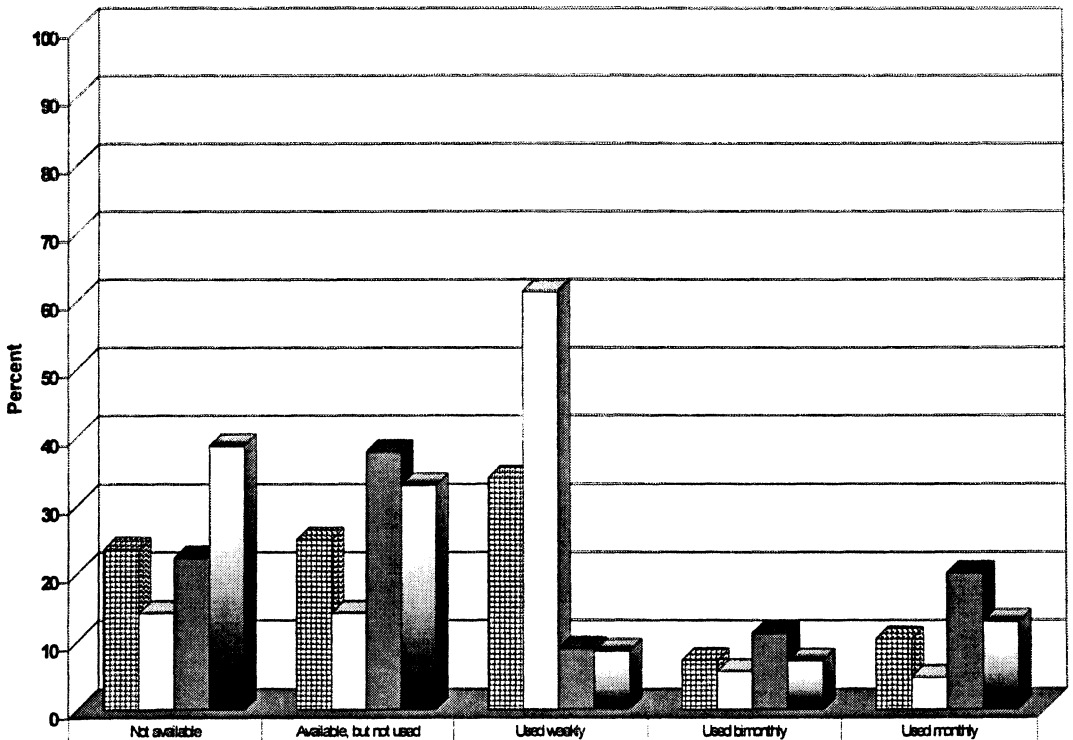
Question 62 asked teachers about the availability and use of computers for instruction. Analysis revealed a significant difference between schools that participated in the spring 1997 pilot and those that did not. $F(1, 219) = 6.43$; $p < 0.0119$. Response percentages are displayed in Figure 48.



	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly
Total Sample (n=222)	24.32	36.04	18.47	8.56	12.61
Pilot (n=128)	20.31	34.38	20.31	7.81	17.19
Nonpilot (n=94)	29.79	38.30	15.96	9.57	6.38

Figure 48. Response percentages, by participation in spring 1997 pilot, to Question 62: A computer is used by the teacher in instruction.

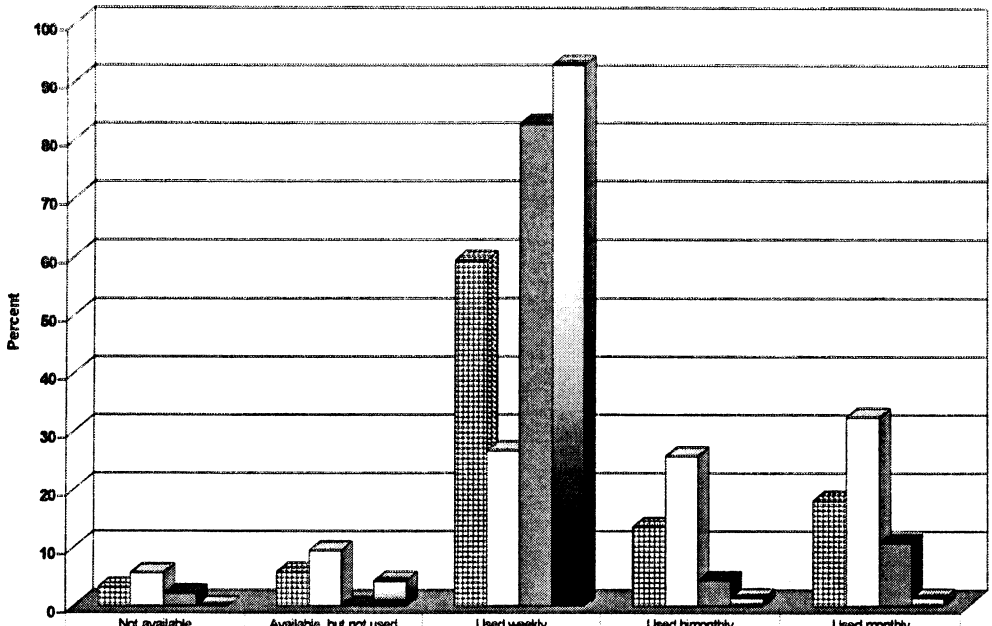
Question 63 asked teachers about the availability and use of computer by students in the classroom. Analysis revealed a significant difference for grade, $F(2, 218) = 3.91$; $p < 0.0215$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between 8th- and 10th-grade teachers. Response percentages are displayed in Figure 49.



	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly
Total Sample (n=221)	23.53	24.89	33.94	7.24	10.41
Grade 4 (n=105)	14.15	14.15	61.32	5.66	4.72
Grade 8 (n=45)	22.22	37.78	8.89	11.11	20.00
Grade 10 (n=70)	38.57	32.86	8.57	7.14	12.86

Figure 49. Response percentages, by grade, to Question 63: A computer is used by the students.

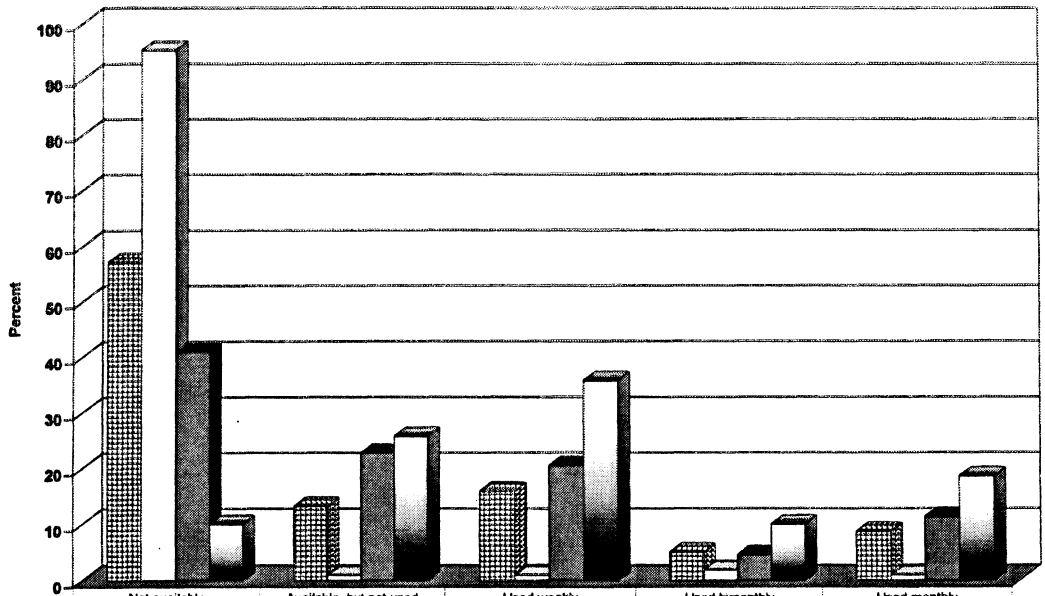
Question 111 asked teachers about the availability and use of calculators in instruction. Analysis revealed a significant difference for grade, $F(2, 216) = 13.75$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of 4th- and 8th-grade teachers and responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 8th- and 10th-grade teachers. Response percentages are displayed in Figure 50.



	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly
Total Sample (n=221)	3.17	5.88	59.28	13.57	18.1
Grade 4 (n=105)	5.71	9.52	26.67	25.71	32.38
Grade 8 (n=46)	2.17	0.00	82.61	4.35	10.87
Grade 10 (n=70)	0.00	4.29	92.86	1.43	1.43

Figure 50. Response percentages, by grade, to Question 111: Calculators used in instruction.

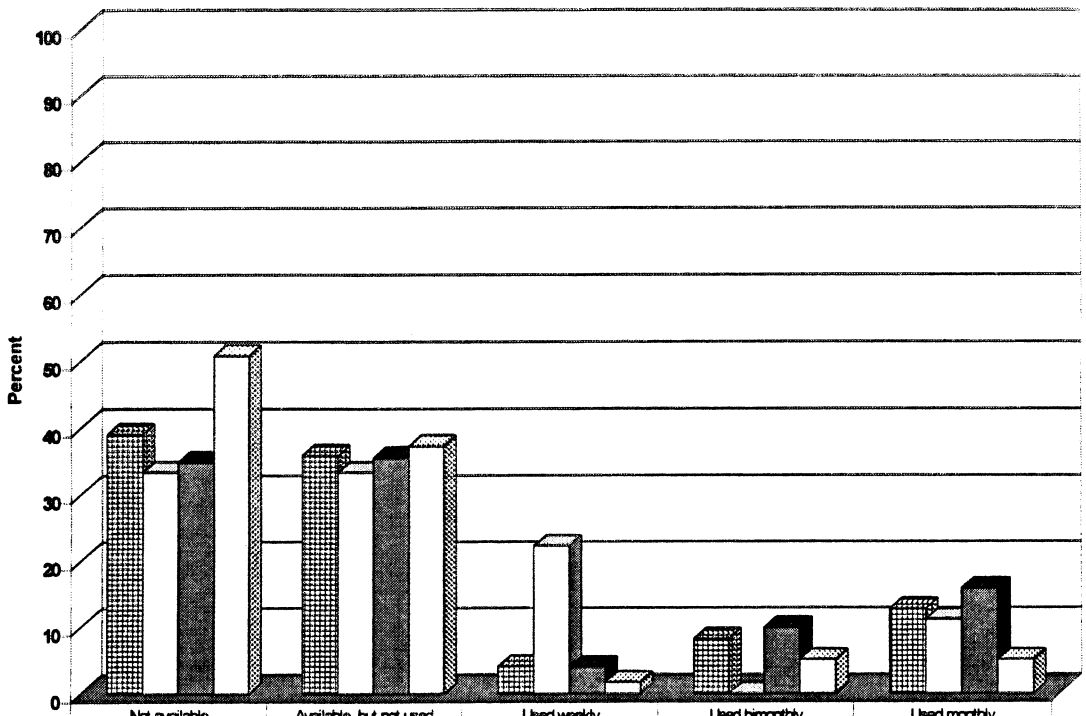
Question 112 asked teachers about the availability and use of graphing calculators in instruction. Analysis revealed a significant difference for grade, $F(2, 216) = 75.73$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of 4th- and 8th-grade, 4th- and 10th-grade, and 8th- and 10th-grade teachers were all significantly different ($p < .05$). Response percentages are displayed in Figure 51.



	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly
Total Sample (n=219)	57.08	13.24	15.98	5.02	8.68
Grade 4 (n=105)	95.24	0.95	0.95	1.90	0.95
Grade 8 (n=44)	40.91	22.73	20.45	4.55	11.36
Grade 10 (n=70)	10.00	25.71	35.71	10.00	18.57

Figure 51. Response percentages, by grade, to Question 112: Graphing calculators are used in instruction.

Question 114 asked teachers to indicate the frequency with which electronic technology is used for spreadsheets, making graphs, or analyzing data. Analysis revealed a significant difference for geographic region, $F(2, 216) = 4.31$; $p < 0.0146$. Post-hoc Scheffé analysis showed that responses of suburban and rural teachers were significantly different ($p < .05$). There were no significant differences between responses of urban and suburban teachers, or between urban and rural teachers. Response percentages are displayed in Figure 52.



	Not available	Available, but not used	Used weekly	Used bimonthly	Used monthly
Total Sample (n=220)	39.09	35.91	4.09	8.18	12.73
Urban (n=9)	33.33	33.33	22.22	0.00	11.11
Suburban (n=152)	34.87	35.53	3.95	9.87	15.79
Rural (n=59)	50.85	37.29	1.69	5.08	5.08

Figure 52. Response percentages, by geographic region, to Question 114: Electronic technology is used for spreadsheets, making graphs, or analyzing data.

Care should be used when interpreting these data because of the small urban sample.

Availability of technological resources

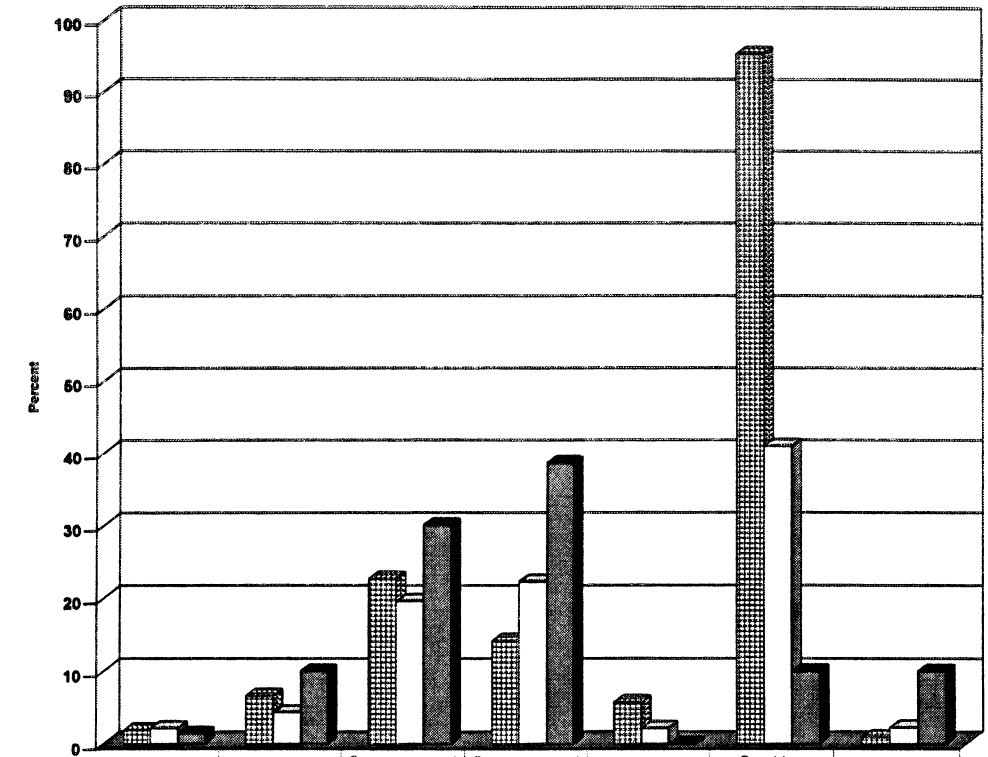
To ascertain the availability of technological resources, respondents to the survey questions related to technology had a "not available" option and an option for "available, but not used." Reports of the findings in these areas are given below.

Not Available. Table 16 indicates the percentage responses, for the entire sample, of those teachers indicating technological resources are not available for their use.

Table 16. Frequency percentage response, for total sample, of teachers stating technological resources are *not available*.

	Frequency	Percent	n
Overhead projector	4	1.8	222
Videotape player	16	7.2	222
Computer used by instructor	54	24.3	222
Computer used by students	52	23.5	221
Calculator	7	3.2	219
Graphing calculator	125	57.1	219
Manipulatives	9	4.1	219

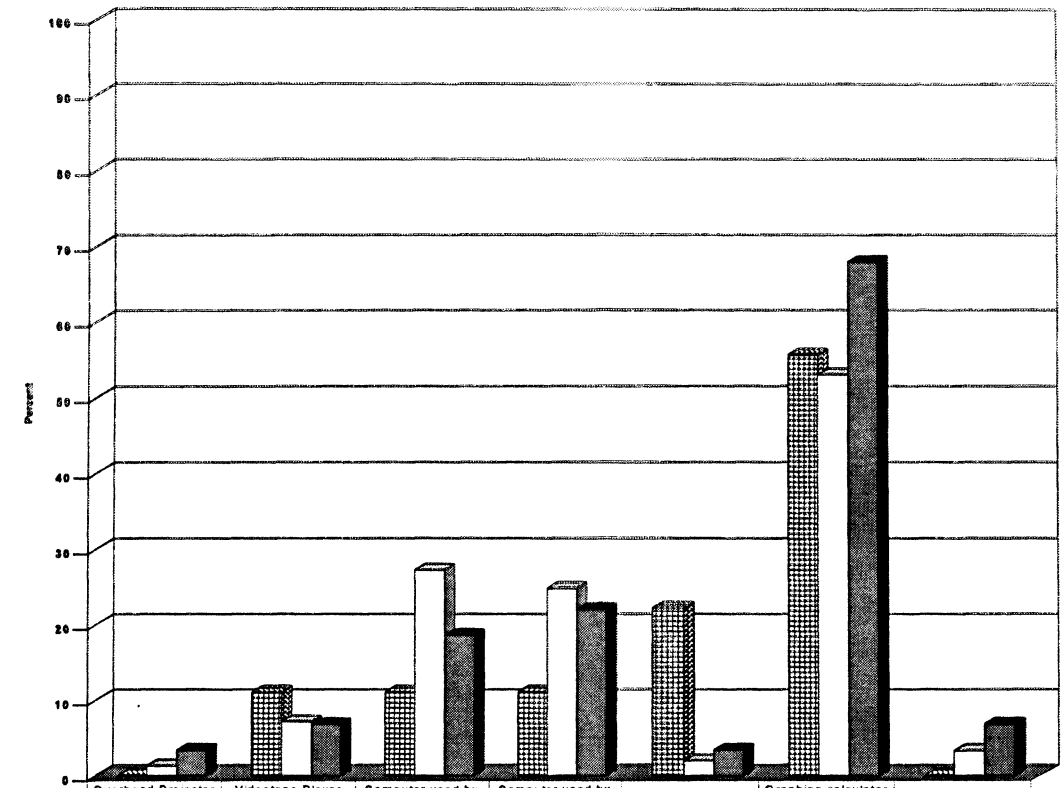
Overall, 24% of the teachers indicate that they do not have access to a computer for use in instruction and 23.5% of teachers indicate that their students do not have access to a computer. Specialized technology, such as graphing calculators, is usually utilized in the upper grades. Figure 53 shows the breakdown by grade level.



	Overhead Projector (n=4)	Videotape Player (n=16)	Computer used by instructor (n=54)	Computer used by students (n=52)	Calculators (n=7)	Graphing Calculators (n=125)	Manipulatives (n=9)
Grade 4	1.89	6.60	22.64	14.15	5.71	95.24	0.95
Grade 8	2.17	4.35	19.57	22.22	2.17	40.91	2.27
Grade 10	1.43	10.00	30.00	38.57	0.00	10.00	10.00

Figure 53. Percentage response of teachers stating technological resources are *not available*, by grade.

Geographic location was another categorical variable examined. Availability of resources did vary across the types of technology. Figure 54 shows the percent responses of teachers indicating unavailability of resources.

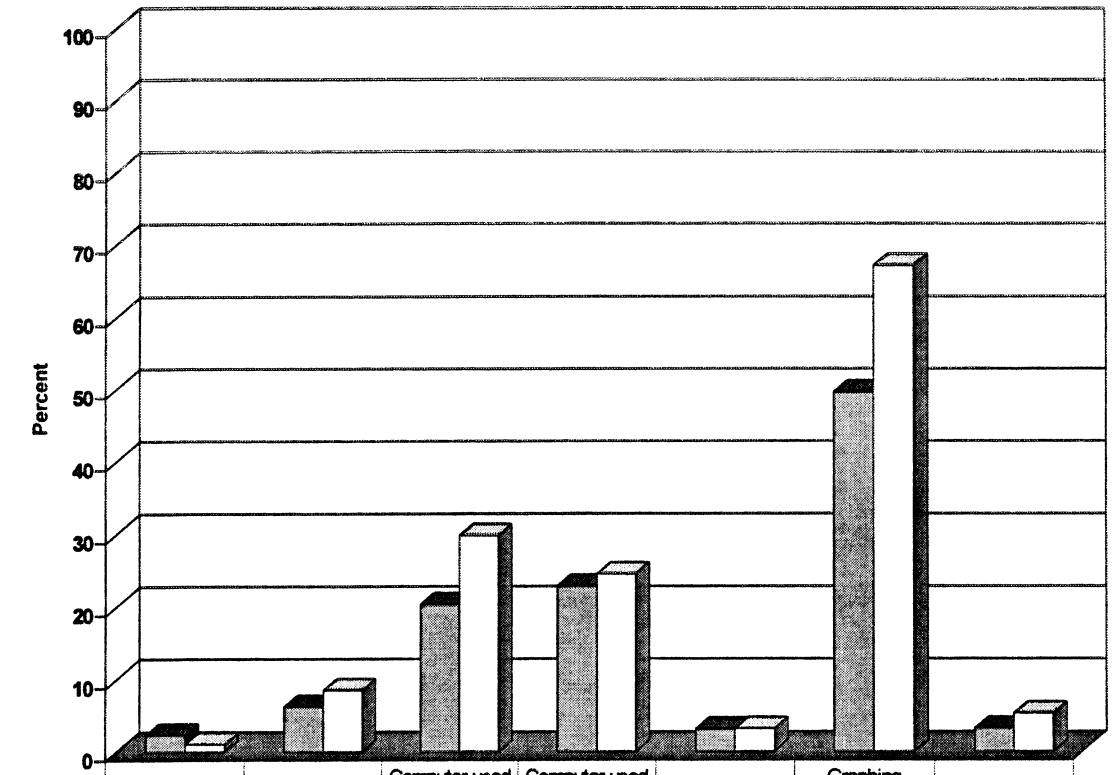


	Overhead Projector (n=4)	Videotape Player (n=16)	Computer used by instructor (n=54)	Computer used by students (n=52)	Calculators (n=7)	Graphing calculator (n=125)	Manipulatives (n=8)
Urban	0.00	11.11	11.11	11.11	22.22	55.56	0
Suburban	1.30	7.14	27.27	24.84	1.96	52.98	3.31
Rural	3.39	6.78	18.64	22.03	3.39	87.8	6.78

Figure 54. Percentage response of teachers stating technological resources are *not available*, by geographic location.

Care should be used when interpreting these data because of the small urban sample.

The final categorical variable includes those districts that participated in the spring 1997 pilot and those that did not. Figure 55 indicates the percentage responses broken down by those two categories.



	Overhead Projector (n=4)	Videotape Player (n=16)	Computer used by instructor (n=54)	Computer used by students (n=52)	Calculators (n=7)	Graphing calculator (n=125)	Manipulatives (n=9)
Pilot	2.34	6.25	20.31	22.83	3.15	49.6	3.2
Non-pilot	1.06	8.51	29.79	24.47	3.19	67.02	5.32

Figure 55. Percentage response of teachers stating technological resources are *not available*, by participation in pilot testing.

Available But Not Used. Table 17 indicates the percentage responses, for the entire sample, of those teachers indicating technological resources are available but are not used for instruction.

Table 17. Frequency percentage response of teachers stating technological resources are *available but not used.*

	Frequency	Percent	n
Overhead projector	19	8.6	222
Videotape player	117	52.7	222
Computer used by instructor	80	36.0	222
Computer used by students	55	24.9	221
Calculator	13	5.9	219
Graphing calculator	29	13.2	219
Manipulatives	13	5.9	219

Overall, nearly 53% of the teachers indicate that they have access to a videotape player, but do not use it and 36% indicated that a computer was available but not used in instruction. It should be noted that reasons why teachers were not utilizing this type of equipment were not explored in this particular survey. Certainly the number and location of computers would have an influence on how well an instructor could incorporate computer use within the classroom setting. Another important variable is teacher training and familiarity with computers.

Use of Technology in Missouri Classrooms

Overhead Projectors. Overall, teachers reported frequent use of an overhead projector. Seventy-two percent (72%) of teachers report using an overhead weekly. Use of the overhead projector by teachers at all grade levels tends to be extensive, with all grade levels reporting frequent use by two-thirds or more of respondents.

Videotape Players. Videotape players were not available for 7% of the sample and 53% of the sample indicated that videotape players were available but not used. Only 5% of respondents report using a videotape player weekly.

Computer. Twenty-four percent (24%) of responding teachers do not have access to computers for instructional use. Computers are available but not used by 36% of respondents,

but 18.5% report use of computers weekly. Twenty-five percent (25%) of the teachers report that students have access to computers, but do not use them.

Calculators. Only 3% of respondents indicated that calculators were not available. Fifty-nine percent (59%) of the sample indicated that calculators were used weekly.

Graphing Calculators. Graphing calculators are most frequently used at secondary levels of instruction. Sixteen percent (16%) of teachers indicate use of graphing calculators weekly.

Manipulatives. Only 4% of respondents indicated that manipulatives were not available. Forty-five percent (45%) of the sample indicated that manipulatives were used weekly.

Teacher Beliefs

Introduction

Questions 64 through 88 listed various statements about the general learning environment. A Likert-scale format asked respondents to indicate the degree to which they agreed or disagreed with the statements. A second set of questions, 97 through 110, asked teachers to respond to statements that were specific to mathematics, using the same Likert scale.

Q64:	Student work areas should be flexible to accommodate a variety of learning activities, whether it be working individually or in small groups.
Q65:	Portfolio assessment is more useful than traditional tests.
Q66:	Instruction should be composed of projects and centers.
Q67:	Subject matter should be integrated into all areas of the curriculum.
Q68:	Novel solutions to problems should be encouraged.
Q69:	Most of teacher preparation time should be used to prepare the classroom for hands-on activities.
Q70:	A test is the most appropriate way to gauge a student's achievement.
Q71:	The teacher's part in the attainment of subject matter is to diagnose and correct errors.
Q72:	Assessment should be integrated into the learning and instructional process.
Q73:	The teacher should primarily lead whole group instruction.
Q74:	Teachers facilitate students finding their own meaning in experiences and interpretations of their environment.
Q75:	It is important to have numerical scores so that a student's progress can be compared to that of other students.
Q76:	Teachers should impart knowledge to students.
Q77:	Students should be left to choose or form their own learning goals and objectives.
Q78:	A quiet classroom is more productive than a busy and noisy room.
Q79:	Teachers construct the correct understanding for students.
Q80:	Learning should consist primarily of hands-on activities.
Q81:	Students need to learn basic skills before they can learn higher order thinking skills.
Q82:	It is best when only one activity is taking place at one time in the classroom.

Q83: One of the main purposes of assessment is to gauge whether or not a student has mastered the material to know whether a student can move on to the next level of instruction.
Q84: Teachers and curriculum developers should decide what children learn and how they learn it.
Q85: Teachers should imbed subject matter in authentic experiences.
Q86: The best way for students to show they have mastered the subject matter is to demonstrate that knowledge.
Q87: Instruction should be divided into separate subject areas.
Q88: Instruction and assessment should be separate otherwise teaching to the test will occur.
Q97: Students learn math best in classes with students of similar abilities.
Q98: It is important for students to learn basic math terms and formulas before learning underlying concepts and principles.
Q99: Laboratory based math classes are more effective than non-laboratory classes.
Q100: I enjoy teaching math.
Q101: I feel supported by colleagues to try out new ideas in teaching math.
Q102: I receive support from the school administration for teaching math.
Q103: Math teachers in this school regularly share ideas.
Q104: Math teachers in this school regularly observe each other teaching classes as part of sharing and improving instruction.
Q105: Activity-based math experiences aren't worth the time and expense.
Q106: I am required to follow rules at this school that conflict with my best professional judgment about teaching and learning math.
Q107: Most math teachers in this school contribute actively in math curriculum development.
Q108: I consider myself a "master" teacher.
Q109: I feel that I have many opportunities to learn new things in my present job.
Q110: I have time during the regular school week to work with my peers on curriculum.

Tables 18 and 19 report mean responses for the total sample in each of these areas. The Likert scale runs from 1 (Strongly disagree) to 5 (Strongly agree).

Table 18. Mean responses, for total sample, to Questions 64 through 88.

Question	Mean	SD	n
64	4.33	0.83	221
65	2.72	0.89	221
66	3.01	0.83	220
67	3.89	0.69	220
68	4.19	0.68	221
69	3.25	0.89	221
70	2.96	0.84	220
71	2.91	0.89	220
72	4.05	0.61	221
73	2.99	0.83	221
74	3.78	0.84	221
75	2.99	0.94	221
76	3.69	0.78	221
77	2.26	0.76	221
78	2.49	0.94	221
79	2.95	0.82	219
80	3.02	0.82	221
81	3.54	1.09	221
82	2.68	0.83	221
83	3.71	0.74	221
84	3.23	0.94	220
85	3.91	0.62	221
86	4.12	0.55	221
87	2.79	0.82	221
88	2.57	0.89	220

Table 19. Mean responses, for total sample, to Questions 97 through 110.

Question	Mean	SD	n
97	3.05	1.10	221
98	3.01	1.12	221
99	3.11	0.67	220
100	4.52	0.60	221
101	4.23	0.78	221
102	4.10	0.88	221
103	3.85	1.00	221
104	2.00	0.88	221
105	1.90	0.75	221
106	1.83	0.95	220
107	3.35	1.09	221
108	3.67	0.94	221
109	4.02	0.82	221
110	2.26	1.15	221

Analysis of Teacher Beliefs

Items in this section were subjected to an exploratory factor analysis using squared multiple correlations as prior communality estimates. The principal factor method was used to extract the factors, and was followed by a promax (oblique) rotation. A scree test suggested five meaningful factors, so only these factors were retained for rotation.

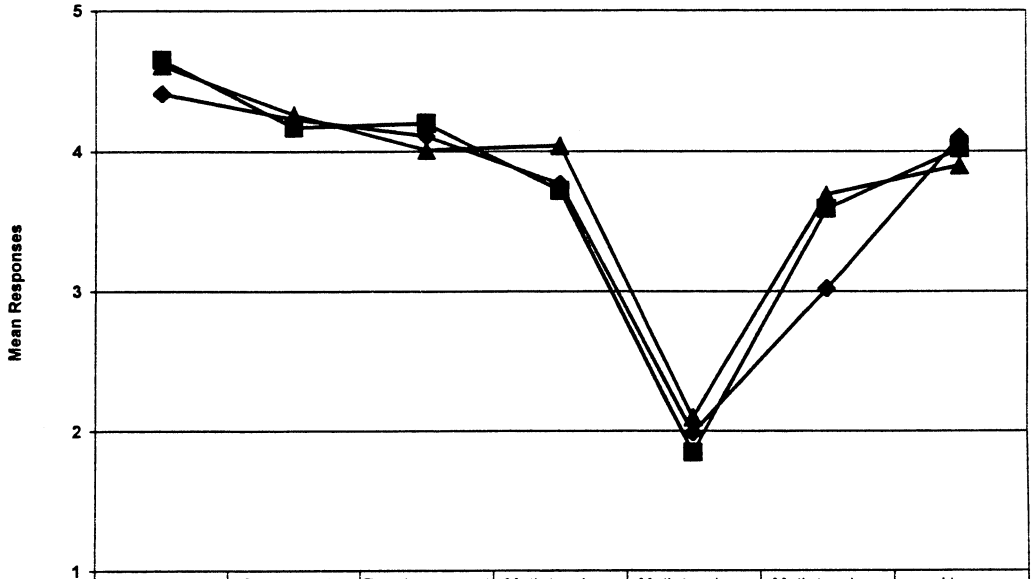
In interpreting the rotated factor pattern, an item was said to load on a given factor if the factor loading was .40 or greater for that factor, and was less than .40 for any other. Using these criteria, seven items were found to load on the first factor, which was subsequently labeled "Factor 1: Teacher Satisfaction." Six items loaded on the second factor, which was labeled "Factor 2: Performance-based Teaching Strategies." The third factor, subsequently labeled "Factor 3: Basic Skills Acquisition," also had six items that loaded on it. Five items loaded on the fourth factor, which was labeled "Factor 4: Student-directed Activities." Finally three items loaded on the fifth factor, subsequently labeled "Factor 5: Traditional Teaching Strategies."

Each factor was then analyzed using one-way MANOVA, between-groups design. Each of these analyses is reported below.

Factor 1: Teacher Satisfaction. Based on the factor analysis, seven items were removed for multivariate analysis, which revealed a significant multivariate effect for grade (Wilks' Lambda $F(14, 424) = 3.6374$, $p = .0001$). The graph of the interaction is presented in Figure 56.

Q100: I enjoy teaching math.
Q101: I feel supported by colleagues to try out new ideas in teaching math.
Q102: I receive support from the school administration for teaching math.
Q103: Math teachers in this school regularly share ideas.
Q104: Math teachers in this school regularly observe each other teaching classes as part of sharing and improving instruction.
Q107: Most math teachers in this school contribute actively in math curriculum development.
Q109: I feel that I have many opportunities to learn new things in my present job.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



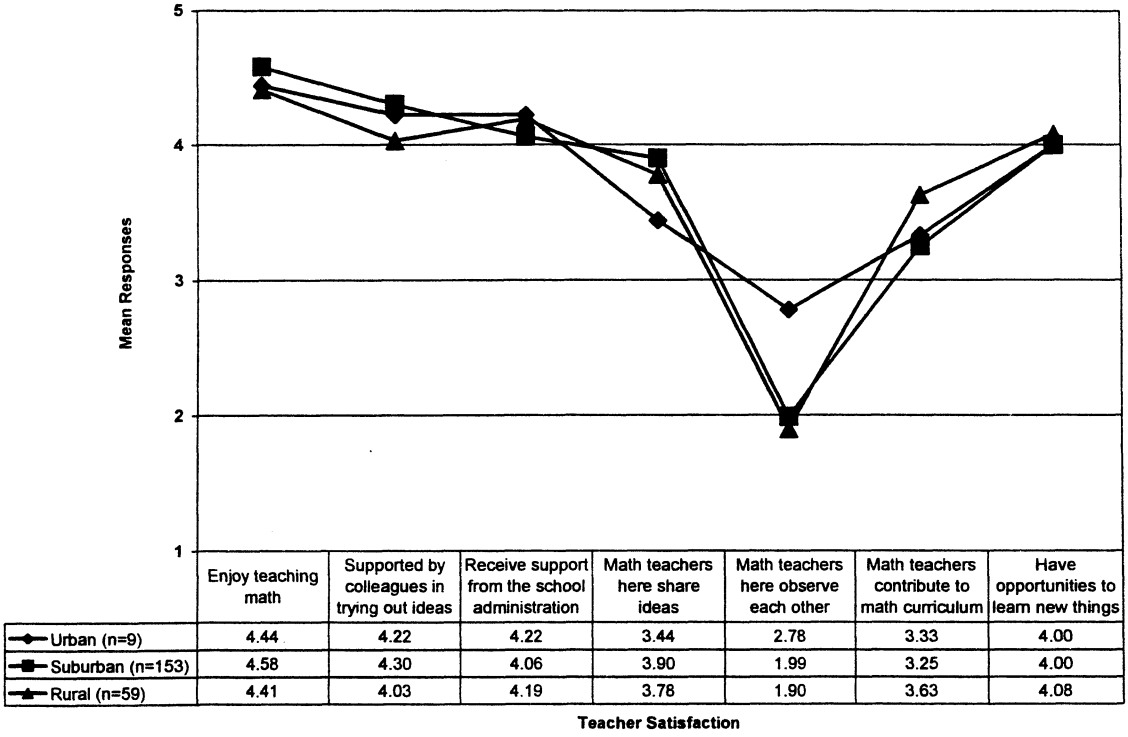
	Enjoy teaching math	Supported by colleagues in trying out ideas	Receive support from the school administration	Math teachers here share ideas	Math teachers here observe each other	Math teachers contribute to math curriculum	Have opportunities to learn new things
Grade 4 (n=105)	4.41	4.23	4.11	3.77	1.99	3.02	4.10
Grade 8 (n=46)	4.65	4.17	4.20	3.72	1.85	3.59	4.02
Grade 10 (n=70)	4.61	4.26	4.01	4.04	2.10	3.69	3.90

Figure 56. Mean responses for Questions 100, 101, 102, 103, 104, 107, and 109, by grade.

Two of these questions showed individual significance. For Question 100 (I enjoy teaching math), $F(2, 218)=3.85$, Tukey's HSD revealed no significant pairs. For Question 100, $F(2, 218)=9.64$, Tukey's HSD revealed that 4th-grade teachers consider themselves contributing to the math curriculum to a significantly lesser extent than do their colleagues at the 8th- and 10th-grade levels.

Multivariate significance was also found by geographic region for this factor (Wilks' Lambda $F(14, 424) = 2.6807$, $p = .0009$). The graph of the interaction is presented in Figure 57.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Enjoy teaching math	Supported by colleagues in trying out ideas	Receive support from the school administration	Math teachers here share ideas	Math teachers here observe each other	Math teachers contribute to math curriculum	Have opportunities to learn new things
Urban (n=9)	4.44	4.22	4.22	3.44	2.78	3.33	4.00
Suburban (n=153)	4.58	4.30	4.06	3.90	1.99	3.25	4.00
Rural (n=59)	4.41	4.03	4.19	3.78	1.90	3.63	4.08

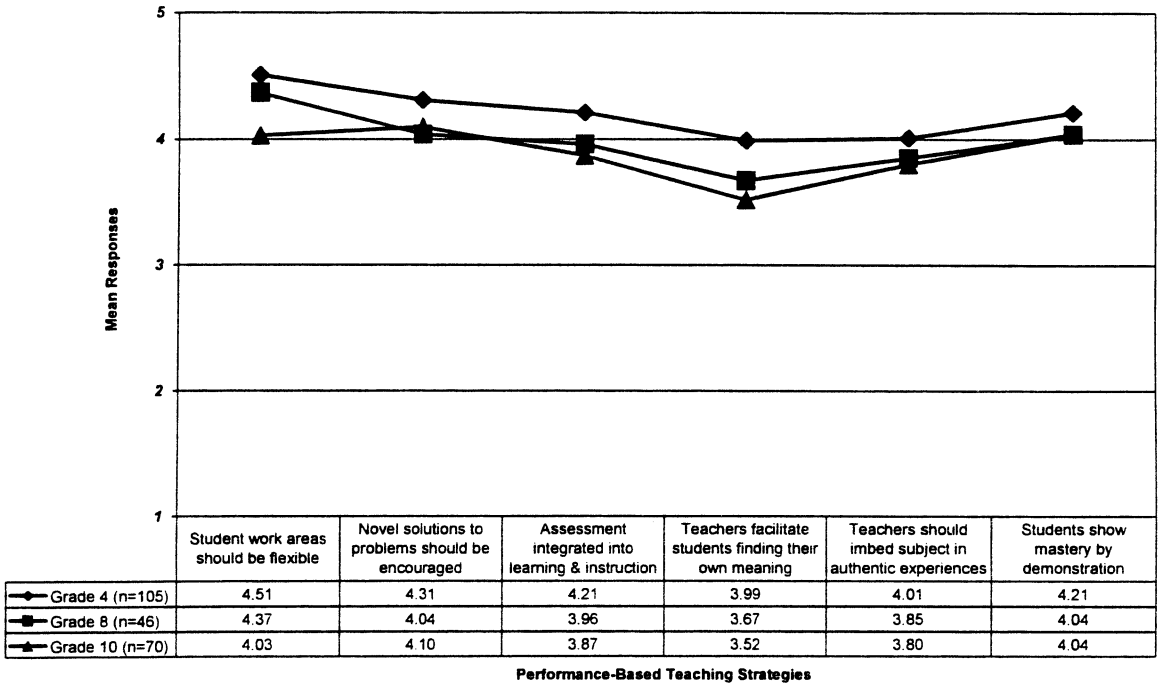
Figure 57. Mean responses for Questions 100, 101, 102, 103, 104, 107, and 109, by geographic region.

Care should be used when interpreting these data because of the small urban sample.

Factor 2: Performance-Based Teaching Strategies. Based on the factor analysis, six items were removed for multivariate analysis, which revealed a significant multivariate effect for grade (Wilks' Lambda F(12, 426) = 3.1006, p = .0003). The graph of the interaction is presented in Figure 58.

Q64:	Student work areas should be flexible to accommodate a variety of learning activities, whether it be working individually or in small groups.
Q68:	Novel solutions to problems should be encouraged.
Q72:	Assessment should be integrated into the learning and instructional process.
Q74:	Teachers facilitate students finding their own meaning in experiences and interpretations of their environment.
Q85:	Teachers should imbed subject matter in authentic experiences.
Q86:	The best way for students to show they have mastered the subject matter is to demonstrate that knowledge.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Student work areas should be flexible	Novel solutions to problems should be encouraged	Assessment integrated into learning & instruction	Teachers facilitate students finding their own meaning	Teachers should imbed subject in authentic experiences	Students show mastery by demonstration
Grade 4 (n=105)	4.51	4.31	4.21	3.99	4.01	4.21
Grade 8 (n=46)	4.37	4.04	3.96	3.67	3.85	4.04
Grade 10 (n=70)	4.03	4.10	3.87	3.52	3.80	4.04

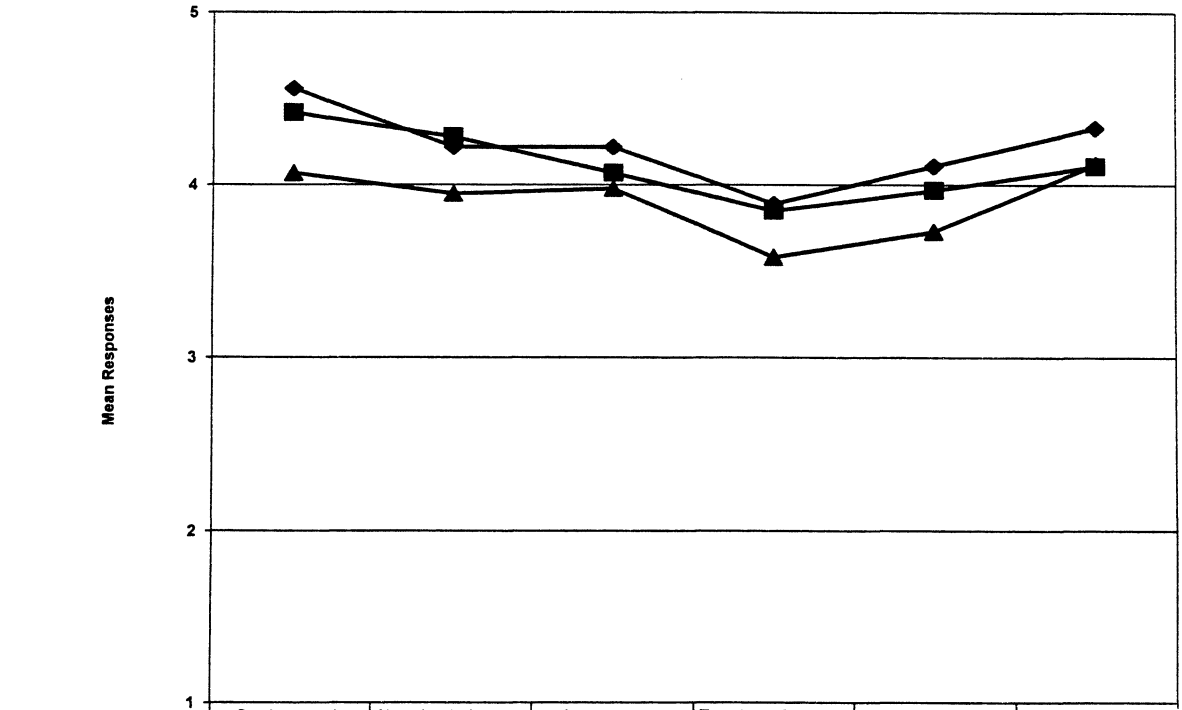
Figure 58. Mean responses for Questions 64, 68, 72, 74, 85, and 86, by grade.

The first four questions in this group displayed significant differences between the grades. For Question 64, F(2, 218)=7.74, Tukey's HSD revealed that the 4th-grade teachers are significantly more likely than 10th-grade teachers to believe that student work areas should be flexible to accommodate a variety of learning activities. While Question 68 was significant, F(2, 218)=3.50, there were no significant pairs. For Question 72, F(2, 218)=7.50, 4th-grade teachers were significantly more likely than 8th- and 10th-grade teachers to believe that assessment should be integrated into the learning and instructional process. In a similar result, 4th-grade

teachers were more likely to believe that teachers facilitate students finding their own meaning in experiences and interpretations of their environment, F(2, 218)=9.46.

Analysis also revealed a significant multivariate effect for geographic region (Wilks' Lambda F(12, 426) = 1.8812, p = .0348). The graph of the interaction is presented in Figure 59.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Student work areas should be flexible	Novel solutions to problems should be encouraged	Assessment integrated into learning &	Teachers facilitate students finding their own meaning	Teachers should imbed subject in authentic	Students show mastery by demonstration
Urban (n=9)	4.56	4.22	4.22	3.89	4.11	4.33
Suburban (n=153)	4.42	4.28	4.07	3.85	3.97	4.11
Rural (n=59)	4.07	3.95	3.98	3.58	3.73	4.12

Performance-Based Teaching Strategies

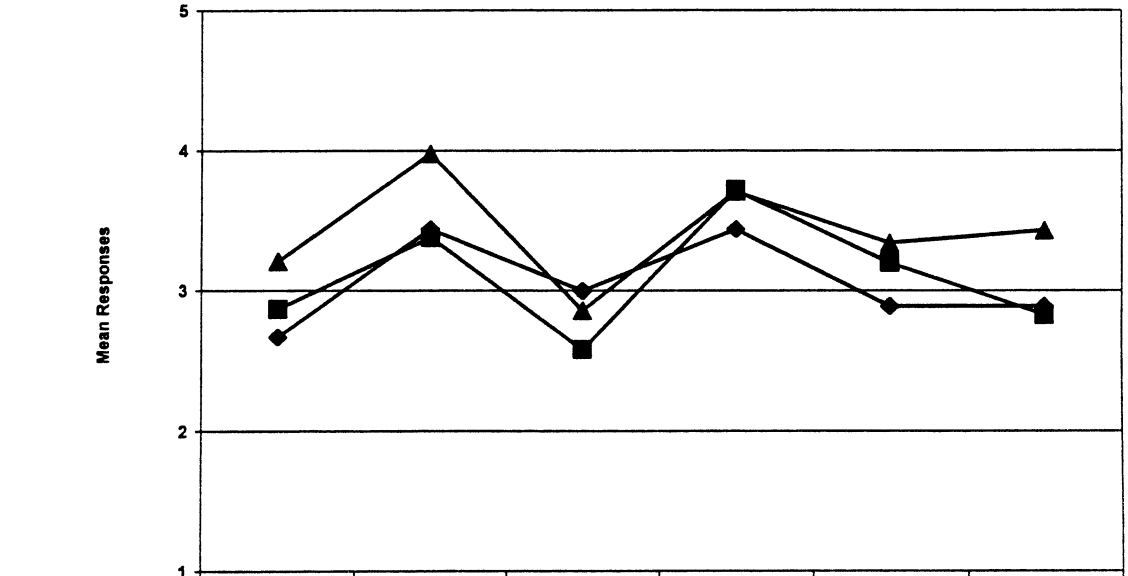
Figure 59. Mean responses for Questions 64, 68, 72, 74, 85, and 86, by geographic region.

Care should be used when interpreting these data because of the small urban sample.

Factor 3: Basic Skills Acquisition. Based on the factor analysis, six items were removed for multivariate analysis, which revealed a significant multivariate effect for geographic region (Wilks' Lambda F(12, 420) = 2.3485, p = .0063). The graph of the interaction is presented in Figure 60.

Q79:	Teachers construct the correct understanding for students.
Q81:	Students need to learn basic skills before they can learn higher order thinking skills.
Q82:	It is best when only one activity is taking place at one time in the classroom.
Q83:	One of the main purposes of assessment is to gauge whether or not a student has mastered the material to know whether a student can move on to the next level of instruction.
Q84:	Teachers and curriculum developers should decide what children learn and how they learn it.
Q98:	It is important for students to learn basic math terms and formulas before learning underlying concepts and principles.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Teachers construct correct understanding	Learn basic skills first	One activity at a time	Assessment gauges mastery of subject	Teachers should decide what children learn	Learn basic math terms and formulas first
Urban (n=9)	2.67	3.44	3.00	3.44	2.89	2.89
Suburban (n=151)	2.87	3.38	2.58	3.72	3.20	2.83
Rural (n=58)	3.21	3.98	2.86	3.71	3.34	3.43

Basic Skills Acquisition

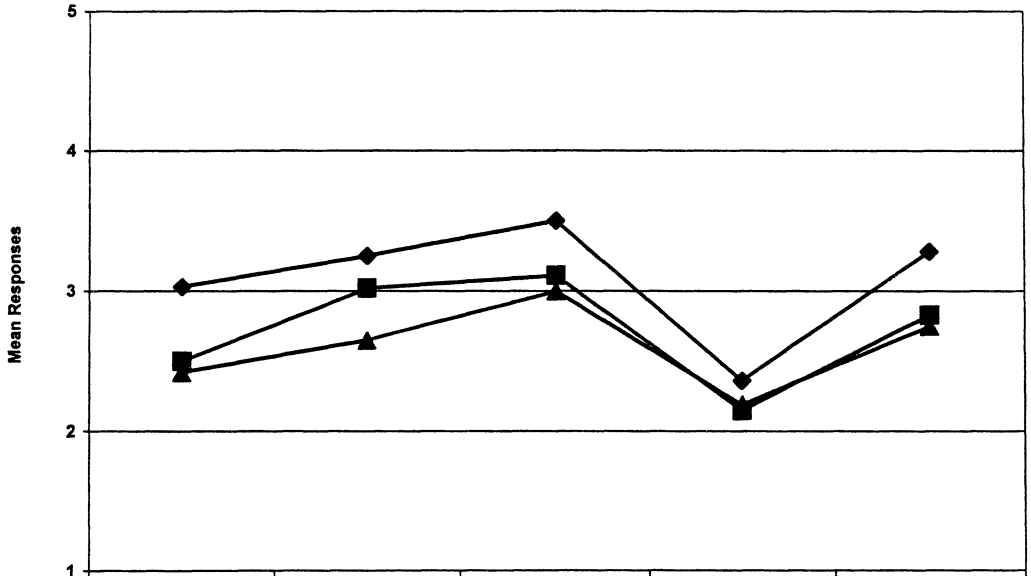
Figure 60. Mean responses for Questions 79, 81, 82, 83, 84, and 98, by geographic region.

Care should be used when interpreting these data because of the small urban sample.

Factor 4: Student-Directed Activities. Based on the factor analysis, five items were removed for multivariate analysis, which revealed a significant multivariate effect for grade (Wilks' Lambda $F(10, 426) = 4.4662$, $p = .0001$). The graph of the interaction is presented in Figure 61.

Q65: Portfolio assessment is more useful than traditional tests.
Q66: Instruction should be composed of projects and centers.
Q69: Most of teacher preparation time should be used to prepare the classroom for hands-on activities.
Q77: Students should be left to choose or form their own learning goals and objectives.
Q80: Learning should consist primarily of hands-on activities.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Portfolio assessment more useful than traditional tests	Instruction composed of projects and centers	Teacher preparation for hands-on activities	Students should be left to choose their own objectives	Learning should consist primarily of hands on activities
Grade 4 (n=105)	3.03	3.25	3.50	2.36	3.28
Grade 8 (n=46)	2.50	3.02	3.11	2.15	2.83
Grade 10 (n=69)	2.42	2.65	3.00	2.19	2.75

Student-Directed Activities

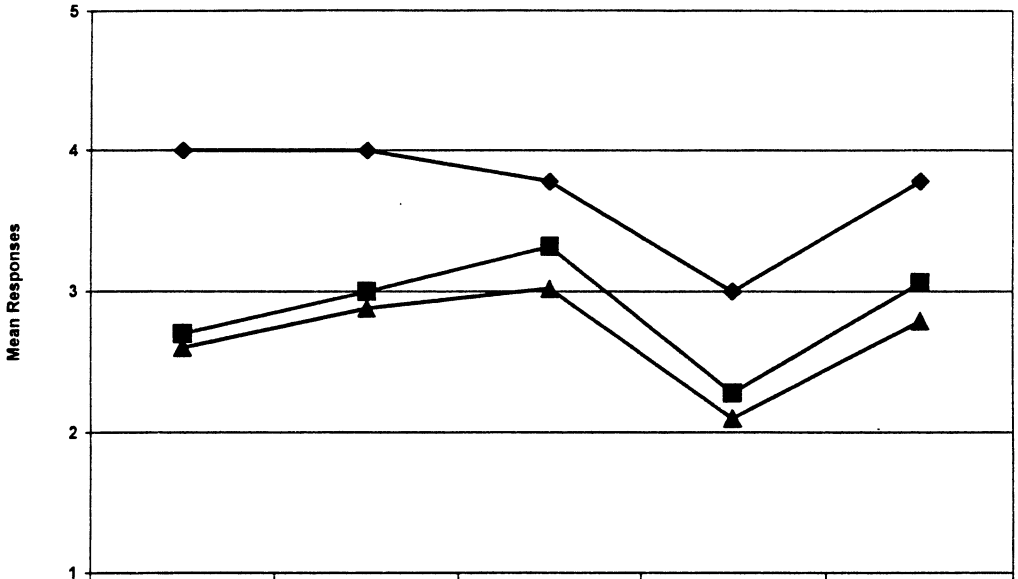
Figure 61. Mean responses for Questions 65, 66, 69, 77, and 80, by grade.

All but one of these questions showed significance at the individual level. For Question 65, $F(2, 217)=13.21$, Tukey's HSD revealed that 4th-grade teachers believe that portfolio assessment is more useful than traditional tests significantly more than their colleagues at the 8th- and 10th-grade levels. With Question 66, $F(2, 217)=11.76$, Tukey's HSD demonstrated that 4th- and 8th-grade teachers believe that instruction should be composed of projects and centers significantly more than 10th-grade teachers. The belief that most of teacher preparation time should be used to prepare the classroom for hands-on activities, Question 69, $F(2, 217)=7.96$, was held significantly higher by 4th-grade teachers than by either 8th- or 10th-grade teachers.

Finally, for Question 80, $F(2, 218)=3.85$, we observed a similar response where 4th-grade teachers were significantly more likely to agree with the statement that learning should consist primarily of hands-on activities.

Multivariate significance was also found by geographic region for this factor (Wilks' Lambda $F(10, 426) = 2.1117$, $p = .0003$). The graph of the interaction is presented in Figure 62.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Portfolio assessment more useful than traditional tests	Instruction composed of projects and centers	Teacher preparation for hands-on activities	Students should be left to choose their own objectives	Learning should consist primarily of hands on activities
Urban (n=9)	4.00	4.00	3.78	3.00	3.78
Suburban (n=153)	2.70	3.00	3.32	2.28	3.06
Rural (n=58)	2.60	2.88	3.02	2.10	2.79

Student-Directed Activities

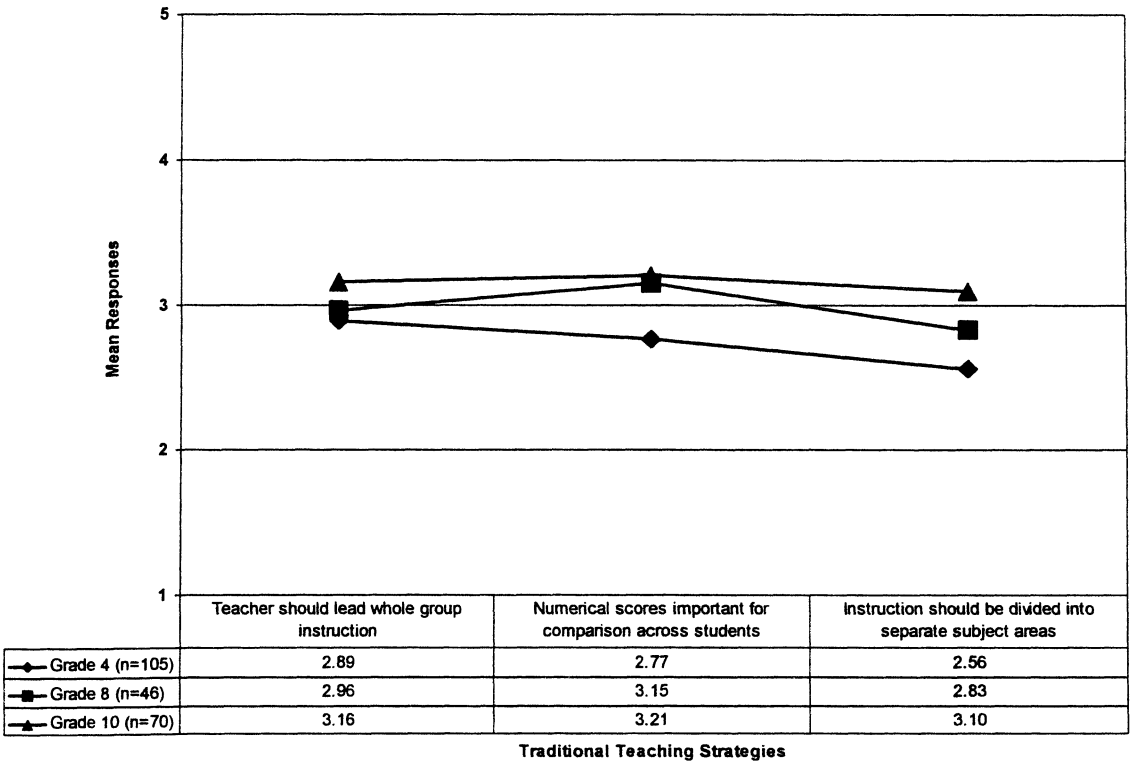
Figure 62. Mean responses for Questions 65, 66, 69, 77, and 80, by geographic region.

Care should be used when interpreting these data because of the small urban sample.

Factor 5: Traditional Teaching Strategies. Based on the factor analysis, three items were removed for multivariate analysis, which revealed a significant multivariate effect for grade (Wilks' Lambda $F(6, 432) = 4.4228$, $p = .0002$). The graph of the interaction is presented in Figure 63.

Q73: The teacher should primarily lead whole group instruction. Q75: It is important to have numerical scores so that a student's progress can be compared to that of other students. Q87: Instruction should be divided into separate subject areas.

The scale is 1 (Strongly disagree) to 5 (Strongly agree).



	Teacher should lead whole group instruction	Numerical scores important for comparison across students	Instruction should be divided into separate subject areas
Grade 4 (n=105)	2.89	2.77	2.56
Grade 8 (n=46)	2.96	3.15	2.83
Grade 10 (n=70)	3.16	3.21	3.10

Figure 63. Mean responses for Questions 73, 75, and 87, by grade.

In this factor, two of these variables showed significance individually. For Question 75, $F(2, 218)=5.70$, Tukey's HSD revealed that the 4th-grade teachers were significantly less likely to agree that it is important to have numerical scores so that a student's progress can be compared to that of other students than the 10th-grade teachers. With Question 87, $F(2, 218)=3.85$, we saw the same pattern; 4th-grade teachers were significantly less likely to agree that instruction should be divided into separate subject areas.

Attitudes Toward the Missouri Assessment Program

Questions 89 through 93 asked teachers to respond to questions about the Missouri Assessment Program. A Likert-scale format asked respondents to indicate the degree to which they agreed or disagreed with the statements.

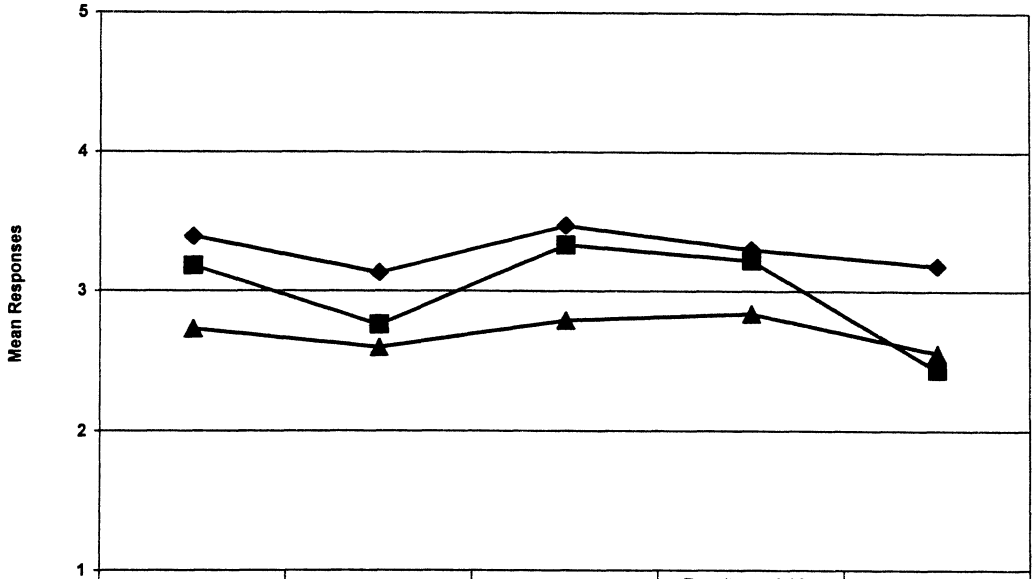
Q89: My overall impression of the new state assessment program is favorable.
Q90: The state assessment program is effective.
Q91: The new assessment results will be useful for instructional planning.
Q92: The new assessment results will be useful for addressing student needs.
Q93: The new assessment results will be useful for parent conferencing.

Table 20 reports mean responses for the total sample in each of these areas. The Likert scale runs from 1 (Strongly disagree) to 5 (Strongly agree).

Table 20. Mean responses, for total sample, to Questions 89 through 93.

Question	Mean	SD	n
89	3.14	1.06	221
90	2.89	0.97	220
91	3.21	1.01	221
92	3.13	1.00	221
93	2.83	1.00	221

Results were analyzed using one-may MANOVA, between-groups design across each of the categorical variables: grade, geographic region, and participation in the spring 1997 pilot. The analysis revealed a significant multivariate effect for grade (Wilks' Lambda $F(10, 426) = 6.8236$, $p = .0001$). The graph of the interaction is presented in Figure 64.



	Impression of MAP is favorable	MAP is effective	Results useful for instructional planning	Results useful for addressing student needs	Results useful for parent conferencing
Grade 4 (n=105)	3.39	3.13	3.47	3.30	3.18
Grade 8 (n=45)	3.18	2.76	3.33	3.22	2.44
Grade 10 (n=70)	2.73	2.60	2.79	2.84	2.56

Figure 64. Mean responses for Questions 89, 90, 91, 92, and 93, by grade.

Results of individual questions were analyzed using a one-way ANOVA, between-groups design. Question 89: This analysis revealed a significant difference for grade, $F(2, 217) = 8.75$; $p < 0.0002$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers.

Question 90: This analysis revealed a significant difference for grade, $F(2, 217) = 7.18$; $p < 0.0010$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers.

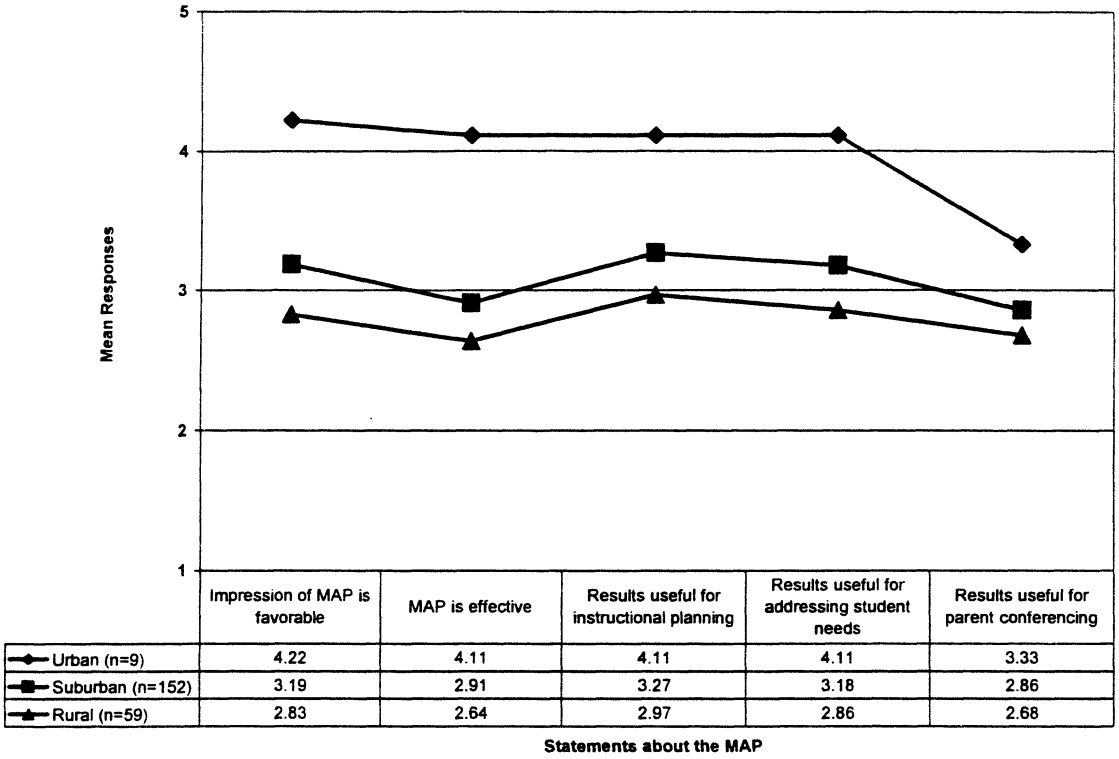
Question 91: This analysis revealed a significant difference for grade, $F(2, 217) = 11.06$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers and responses of 8th- and 10th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 4th- and 8th-grade teachers.

Question 92: This analysis revealed a significant difference for grade, $F(2, 217) = 4.55$; $p < 0.0116$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers.

Question 93: This analysis revealed a significant difference for grade, $F(2, 217) = 13.75$; $p < 0.0001$. Post-hoc Scheffé analysis showed that responses of 4th- and 8th-grade teachers and

responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There was no significant difference between responses of 8th- and 10th-grade teachers.

Analysis also revealed a significant multivariate effect for geographic region (Wilks' Lambda $F(10, 426) = 2.6383$, $p = .0040$). The graph of the interaction is presented in Figure 65.



	Impression of MAP is favorable	MAP is effective	Results useful for instructional planning	Results useful for addressing student needs	Results useful for parent conferencing
Urban (n=9)	4.22	4.11	4.11	4.11	3.33
Suburban (n=152)	3.19	2.91	3.27	3.18	2.86
Rural (n=59)	2.83	2.64	2.97	2.86	2.68

Figure 65. Mean responses for Questions 89, 90, 91, 92, and 93, by geographic region.

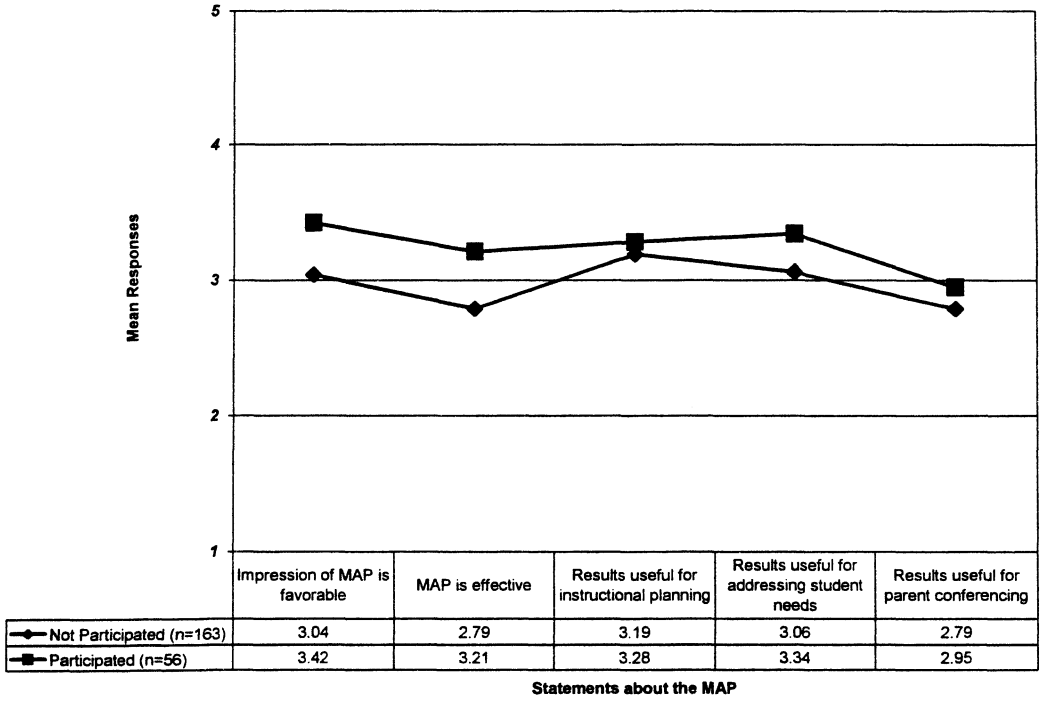
Care should be used when interpreting these data because of the small urban sample.

Results were further analyzed across the variables that dealt with curriculum development. Groups were divided by their response of yes or no to the following items:

Q94: Have you served on a school or district math curriculum development committee?
Q95: Have you served on a school district or state assessment development or selection committee?
Q96: Have you participated in a formal performance assessment scoring activity beyond your own classroom?

They were then compared across items 89 through 93 relating to attitudes toward the MAP. The analysis only revealed a significant multivariate effect for Question 95, which asked if the teacher had served on a school district or state assessment development or selection

committee (Wilks' Lambda $F(5, 213) = 2.6542$, $p = .0237$). The graph of the interaction is presented in Figure 66.



	Impression of MAP is favorable	MAP is effective	Results useful for instructional planning	Results useful for addressing student needs	Results useful for parent conferencing
Not Participated (n=163)	3.04	2.79	3.19	3.06	2.79
Participated (n=56)	3.42	3.21	3.28	3.34	2.95

Figure 66. Mean responses for Questions 89, 90, 91, 92, and 93, by participation in curriculum or assessment development activities.

Another section of the survey, Questions 115 through 119, queried teachers about their impression of the assessment itself. The scale was 1 (Poor) to 5 (Excellent). Table 21 reports the mean responses for each question.

Q115: Instructions for the test.
Q116: Test materials.
Q117: Amount of time needed for test preparation and administration.
Q118: Timeliness of results.
Q119: Format.

Table 21. Mean responses, for total sample, to Questions 115 through 119.

Question	Mean	SD	n
115	3.34	0.86	204
116	3.36	0.92	204
117	3.15	0.98	203
118	2.38	1.11	204
119	2.94	1.01	201

Results were analyzed using one-way MANOVA, between-groups design across each of the categorical variables: grade, geographic region, and participation in the spring 1997 pilot. The analysis failed to reveal a significant multivariate effect for any of these variables.

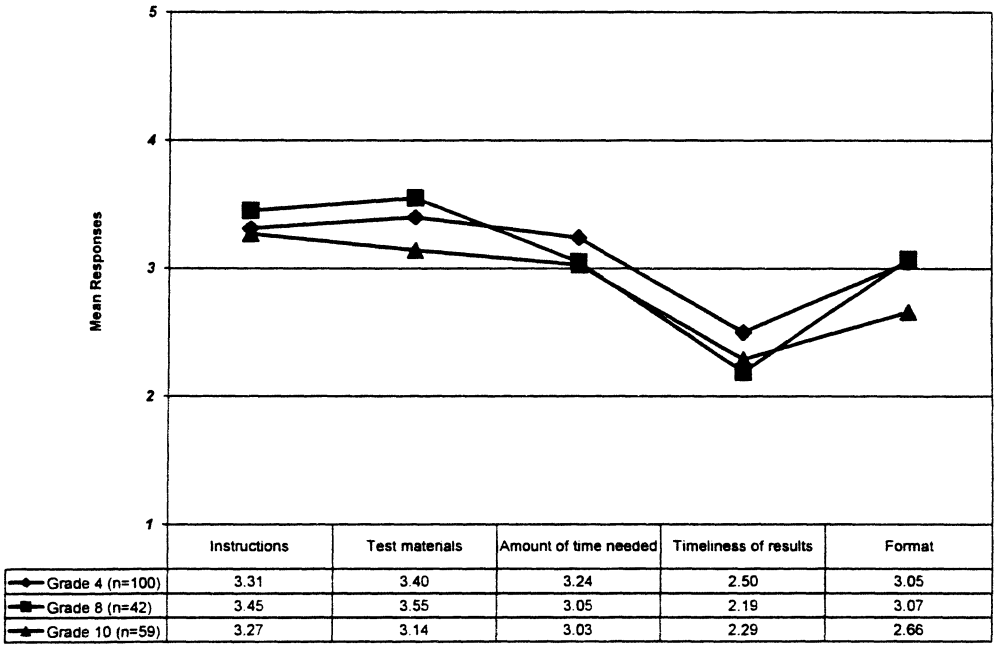
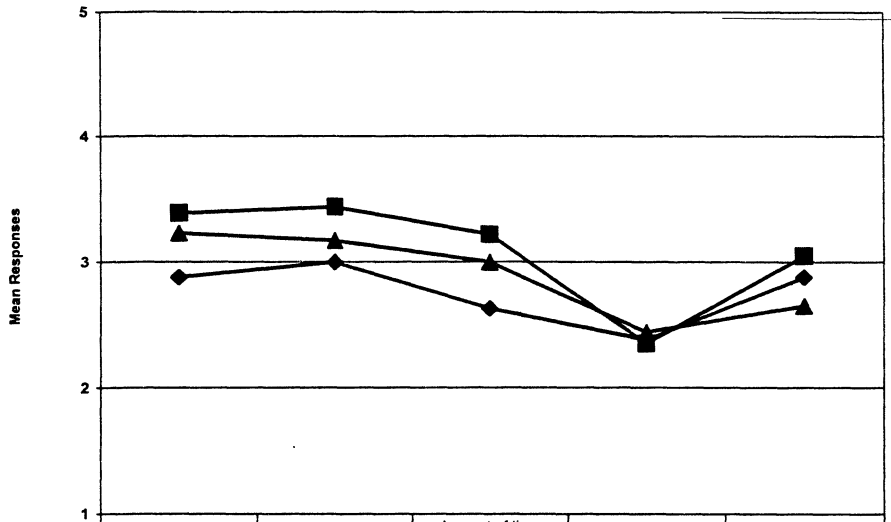


Figure 67. Mean responses for Questions 115, 116, 117, 118, and 119, by grade.

Results of individual questions were analyzed using a one-way ANOVA, between-groups design. Question 116: This analysis revealed a significant difference for grade, $F(2, 198) = 3.47$; $p < 0.0331$. Post-hoc Scheffé analysis showed that responses of 8th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 4th- and 10th-grade teachers.

For Question 119 (Format), analysis revealed a significant difference for grade, $F(2, 198) = 3.25$; $p < 0.0408$. Post-hoc Scheffé analysis showed that responses of 4th- and 10th-grade teachers were significantly different ($p < .05$). There were no significant differences between responses of 4th- and 8th-grade teachers, or between responses of 8th- and 10th-grade teachers.



	Instructions	Test materials	Amount of time needed	Timeliness of results	Format
Urban (n=8)	2.88	3.00	2.63	2.38	2.88
Suburban (n=141)	3.39	3.44	3.22	2.35	3.05
Rural (n=52)	3.23	3.17	3.00	2.44	2.65

Figure 68. Mean responses for Questions 115, 116, 117, 118, and 119, by geographic region.

Results of individual questions were analyzed using a one-way ANOVA, between-groups design. Question 119: Post-hoc Scheffé analysis showed that responses of suburban teachers and rural teachers were significantly different ($p < .05$) for geographic region. Care should be used when interpreting these data because of the small urban sample.

Open-ended Responses

Introduction

Part 3 of the survey, included on a separate sheet, was designed to elicit open-ended responses to several questions regarding class time and the new assessment. This part was divided into three sections. Section 1 asked teachers to indicate the content emphasis and length of their current unit. Section 2 required teachers to indicate the percentage of class time spent on different types of classroom activities. Section 3 consisted of a series of three questions that asked teachers to comment on the mathematics assessment. In this section, they were asked to indicate the types of professional development they would need to interpret the results of the new assessment, along with aspects of the new assessment they liked, disliked, or would change.

Of the 223 surveys returned to CLEAR, 221 responded to at least one question in Part 3. Many of the teachers limited their response to Sections 1 and 2, while others commented only in the open-ended questions of Section 3. Specifically, 220 teachers responded to Section 1 and 219 teachers responded to Section 2. One hundred and sixty-eight (168) teachers responded to Section 3.

Results from the analysis of these data are reported in the following section. Each question was analyzed and is reported separately.

Part 3, Section 1 – Current Unit

Question 1: Content emphasis of current unit. Respondents were asked to indicate the content emphasis of their current unit, by circling all applicable responses.

Tables 22 through 24 display the content emphases reported across categorical variables.

Table 22. Number of respondents reporting units being taught, categorized by grade.

	Grade		
	4th	8th	10th
Multiplication	46	6	5
Division	49	7	5
Decimals	28	9	3
Fractions	54	16	8
General math	32	7	2
Pre-algebra	10	29	7
Algebra I	0	21	24
Algebra II	0	1	20
Trigonometry	1	2	6
Geometry	33	11	30
Integrated curriculum (across discipline)	8	3	3
Other	5	5	3
Measurement	5	0	0

Table 23. Number of respondents reporting units being taught, categorized by geographic region.

	Geographic region		
	Urban	Suburban	Rural
Multiplication	6	32	19
Division	6	35	20
Decimals	7	23	10
Fractions	6	51	21
General math	2	24	15
Pre-algebra	3	30	13
Algebra I	0	33	12
Algebra II	0	16	5
Trigonometry	0	8	1
Geometry	4	51	19
Integrated curriculum (across discipline)	1	12	1
Other	2	14	2
Measurement	0	3	2

Table 24. Number of respondents reporting units being taught, categorized by participation in the 1997 pilot.

	Pilot	Non-pilot
Multiplication	28	29
Division	35	26
Decimals	24	16
Fractions	49	35
General math	17	24
Pre-algebra	28	18
Algebra I	29	16
Algebra II	16	5
Trigonometry	6	3
Geometry	37	35
Integrated curriculum (across discipline)	7	7
Other	8	5
Measurement	3	2

Question 2: Length of current unit. Respondents were asked to indicate the length of their current unit. These answers were combined with results from Questions 1, 2, and 3 on the survey. Tables 25 and 26 display the results by grade and by geographic region.

Table 25. Means of class scheduling information, categorized by grade.

		Grade		
		4th	8th	10th
Block scheduling (n=66)	n	6	14	46
	Length of class period*	2.33	2.57	3.07
	Number of times class meets per week□	5.00	3.50	3.21
	Length of current unit△	2.17	2.57	2.28
No block scheduling (n=155)	n	100	32	23
	Length of class period*	2.09	2.00	2.00
	Number of times class meets per week□	4.95	5	5
	Length of current unit△	2.32	2.59	2.95

* Scale: 1 = Under 40 min., 2 = 40-60 min., 3 = 61-90 min., 4 = 91-120 min., 5 = More than 120 min.
□ Scale: 1 = One time, 2 = Two times, 3 = Three times, 4 = Four times, 5 = Five times
△ Scale: 1 = One week, 2 = Two-Three weeks, 3 = One month, 4 = More than one month.

Table 26. Means of class scheduling information, categorized by geographic region.

		Region		
		Urban	Suburban	Rural
Block scheduling (n=66)	n	5	42	19
	Length of class period*	2.40	2.98	2.89
	Number of times class meets per week□	4.20	3.44	3.24
	Length of current unit△	3.00	2.31	2.21
No block scheduling (n=155)	n	4	111	40
	Length of class period*	2.25	2.06	2.03
	Number of times class meets per week□	5.00	4.95	5.00
	Length of current unit△	3.25	2.50	2.31

* Scale: 1 = Under 40 min., 2 = 40-60 min., 3 = 61-90 min., 4 = 91-120 min., 5 = More than 120 min.
□ Scale: 1 = One time, 2 = Two times, 3 = Three times, 4 = Four times, 5 = Five times
△ Scale: 1 = One week, 2 = Two-Three weeks, 3 = One month, 4 = More than one month.

Part 3, Section 2 - Distribution of Class Time

Items a through e. Figure 69 reports the mean percentage of class time for all parts of Section 2 (a through e). This question asked teachers to report the percentage of their class time spent in various activities: management or administrative routines, interruptions, and other non-instructional activities; teacher-led whole class lecture or discussion; individual student work—reading textbooks, completing worksheets, etc.; small group work; and other activities. All responses where the total amount of class time did not equal 100 percent were excluded from the analysis.

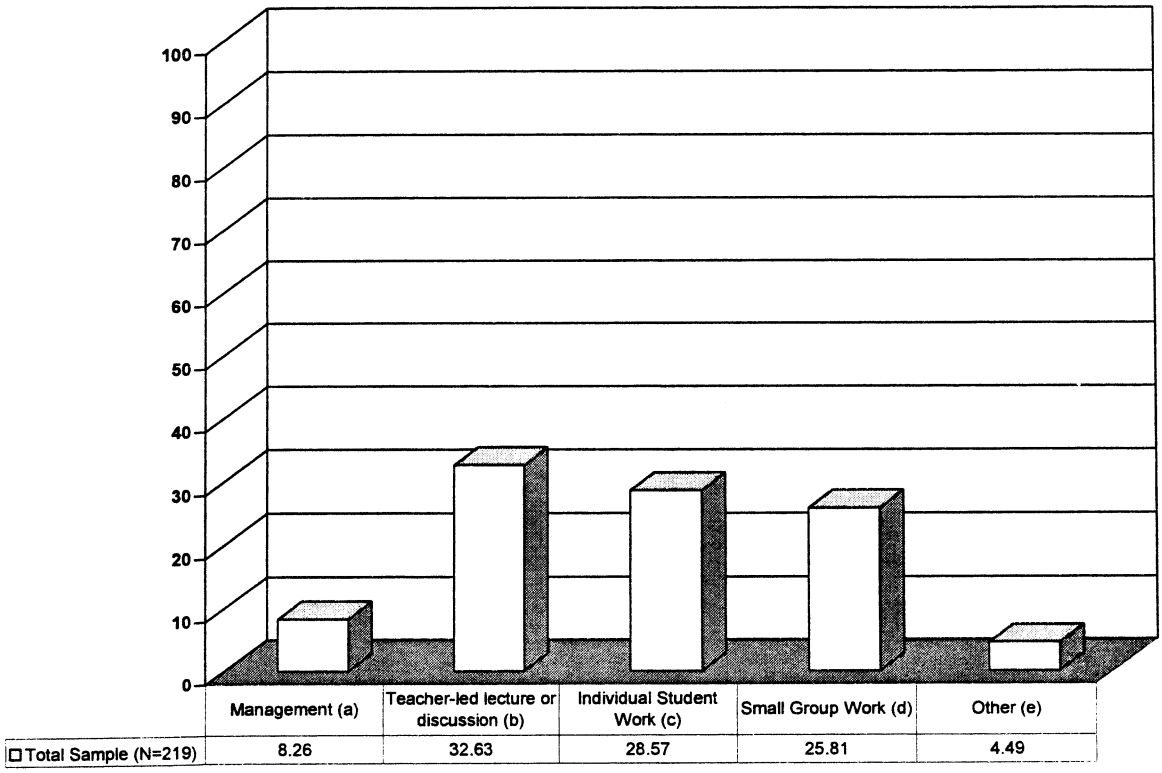
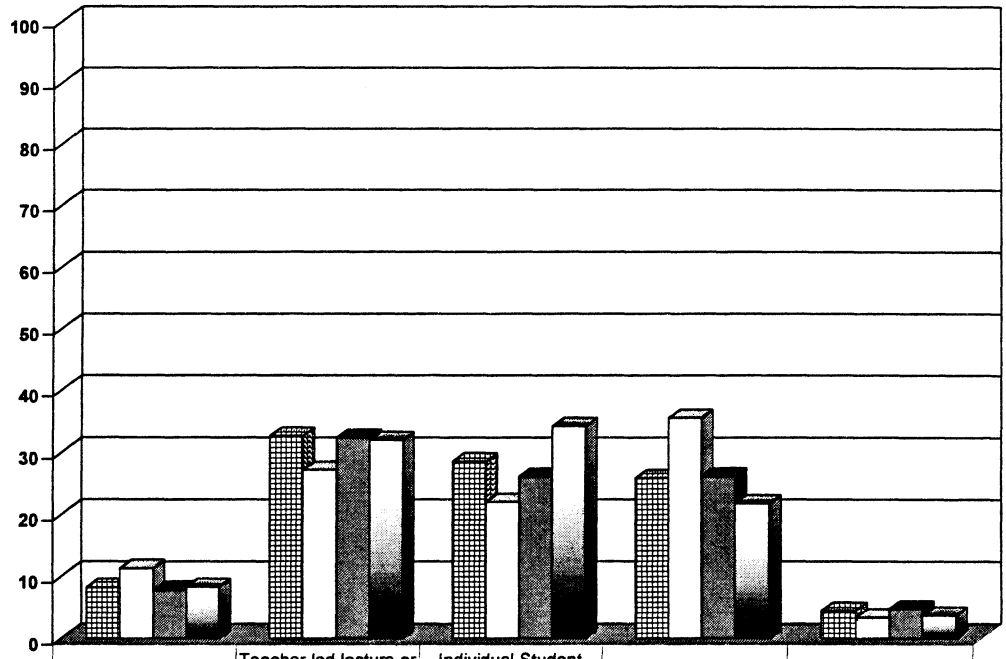


Figure 69. Mean percentage of class time for Part 3, Section 2.

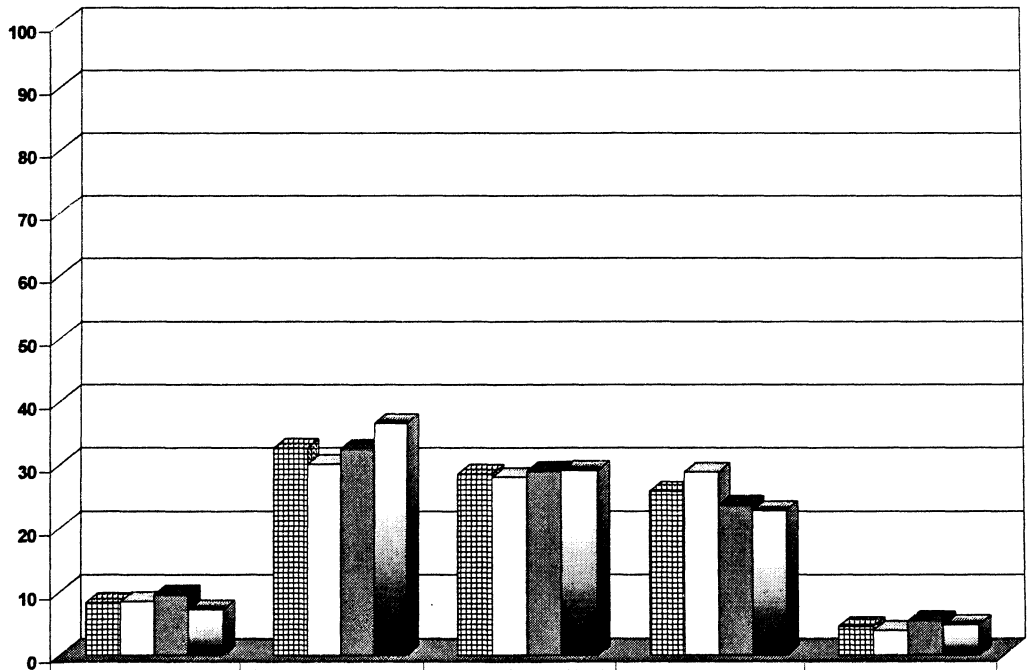
Using the same exclusion criteria, Figure 70 reports the mean percentage of class time for all parts of Section 2 (a through e) with means for geographic region indicated. See detailed analysis of Section 2 response categories on page 96.



	Management (a)	Teacher-led lecture or discussion (b)	Individual Student Work (c)	Small Group Work (d)	Other (e)
Total Sample (N=219)	8.26	32.63	28.57	25.81	4.49
Urban (n=9)	11.33	27.22	22.00	35.56	3.33
Suburban (n=155)	7.86	32.34	26.06	26.12	4.73
Rural (n=59)	8.31	31.98	34.22	21.76	3.73

Figure 70. Mean percentage of class time for Part 3, Section 2, by geographic region.

Using the same exclusion criteria, Figure 71 reports the mean percentage of class time for all parts of Section 2 (a through e) with means for grade (4, 8, or 10) also indicated. Immediately following are detailed analyses of Section 2 response categories.



	Management (a)	Teacher-led lecture or discussion (b)	Individual Student Work (c)	Small Group Work (d)	Other (e)
Total Sample (N=219)	8.26	32.63	28.57	25.81	4.49
Grade 4 (n=104)	8.45	30.08	28.01	28.82	3.89
Grade 8 (n=46)	9.50	32.50	28.98	23.61	5.41
Grade 10 (n=69)	7.16	36.55	29.13	22.75	4.77

Figure 71. Mean percentage of class time for Part 3, Section 2, by grade.

Individual Category Analyses for Section 2.

Question a: Management or administrative routine, interruptions, and other non-instructional activities. Results were analyzed using one-way ANOVA, between groups design. For this question, no significant effects were found.

Question b: Teacher-led whole-class lecture or class discussion. The analysis of variance revealed a significant difference for grade ($F(2,216) = 4.40$, $p = .0134$). Tukey's HSD test showed that responses of 4th and 10th grade teachers were significantly different ($p < .05$). No significant relationships were found between responses to this question and geographical region or participation in pilot assessment.

Question c: Individual student work: reading textbooks, completing worksheets, etc. The analysis of variance revealed a significant difference for geographic region ($F(2,220) = 7.00$ $p = .0011$). Tukey's HSD test showed that responses of suburban and rural teachers were

significantly different ($p < .05$). No significant relationships were found between responses to this question and grade or participation in pilot assessment.

Question d: Small group work. The analysis of variance revealed a significant difference for geographic region ($F(2,220) = 3.14$ $p = .0453$). No significant relationships were found between responses to this question and grade or participation in pilot assessment.

Question e: Other. While teachers reported an average of 2.76% of class time spent in "other" activities, the responses contained so much variance that reporting percentages across grade, region, and pilot participation is not meaningful. Regardless of categorical variable, however, the responses to this question fall into eleven broad categories. The greatest number of teachers who responded to this question mentioned "activities" (13). Correcting and going over homework assignments (7) and working with manipulatives (6) were also mentioned often. Assessment, use of computers/technology, and review followed (4 each). Three (3) teachers each mentioned board work. Finally, two (2) teachers each mentioned peer tutoring, individual projects, guided practice, and journaling.

Part 3, Section 3 – Open Questions

Qualitative items on the insert sheet were coded using QSR Nud*ist Qualitative Software. Because the format of the survey allowed multiple responses to each question, only frequencies are reported.

Professional Development. Most responses in this area indicated a desire for workshops on bringing performance assessment into the classroom (23). One teacher writes that he or she would like to know:

> how to create task oriented assessments, how to grade them, how to work the vast material into an algebra course alone or a geometry course alone.

Closely correlated with this category is the expressed desire to prepare students more adequately for taking the assessment (7). Of these teachers, and those with similar views, many mention the problems that arise when a curriculum pulls them in one direction and an assessment pulls them in another. They seem genuinely willing to incorporate performance assessment into their classrooms if they are given the kind of training necessary to do so. Other instructional issues mentioned by teachers are: how to write performance assessment activities (2), how to promote student accountability (1), how to integrate the computer in the classroom (1), how to manage time so that curriculum is covered and assessment is prepared for (1), how to work with at-risk and learning disabled students (1), and how to work performance assessment into algebra (1).

The second most frequent response was in the area of scoring. Many teachers indicated that they would like a workshop on how the assessment is graded (17). Some of these suggested that they would like the workshop to be conducted by fellow teachers who had actually done grading on the Missouri Assessment Program (MAP) in the past. One teacher would like to see:

> a presentation by teachers who have served as graders, to show/explain exactly how items are scored. Also to respond to some of the info. in "navigating the M.A.P." & other materials that have been released—There is so much stuff to get through, I'm sure I'm overlooking some of the more important ideas, while getting lost in the details.

Several teachers also mentioned the desire to learn to use the MAP rubrics and to learn to write their own examples (11), again demonstrating their desire to incorporate performance assessment into the classroom.

Many teachers continue to have questions about the MAP results. Most people who responded in this category would like to have a clearer understanding of how to interpret the results (10). One teacher writes:

> Personally, I'm not looking for typical professional development (teacher techniques, etc.). Right now, statistics of student achievement would be most helpful. Specifically, which items are students completely "not getting" and which are they mastering. I would like to see a printed test with ratios of correct to incorrect student responses on side of test questions. For example, of the 4th grade class on question # 27 the ratio is 38 correct answers out of 84 total students. [has drawing of fraction showing 38 over 84]

Some are having difficulty explaining the results to parents (3) and would like a workshop dealing with this issue. Two (2) teachers specifically mention that they would like to understand just how the results are used, and the same number wondered if a workshop could not be given where the procedures whereby teachers could use the MAP results to improve teaching in class is addressed.

Some teachers indicated an interest in finding out more about the assessment generally (2), some are concerned with matters of its administration (2), and some want a workshop to center around examples that have been released from the MAP (4).

As far as the structure of professional development is concerned, three (3) teachers mentioned their desire for hands-on activities. Three (3) were more specific: the desire for practice items, for going on visits to successful classrooms, and for having professional development available on videotape were each mentioned by one respondent.

In the category of general responses, some teachers indicate that they would like any kind of professional development (7), some that they are already receiving professional development (7), some that they do not want any (22), and some that they are unsure about which types they want (4). Eighty-seven (87) teachers did not respond to the question.

What Teachers like about the MAP. Teachers are most positive about the emphasis on process that is at the core of the MAP. Ten (10) teachers limited their remarks to that alone, but many more elaborated on what they like about the emphasis on process. Many teachers liked the

fact that the students are required to think and demonstrate knowledge of the material (33), of which, two (2) write:

> It seems that students are exposed to more ideas that stimulate creative thinking and are required to perform at a higher level of thinking. ("synthesis"-Bloom's Taxonomy)

> Students know up front what will be expected of them. Teachers can see how students understand, internalize, and process information through performance. You get a larger scope of what the student really knows and understands.

Almost as many liked the fact that the assessment is relevant and that the problems presented are authentic (31), as these thoughts indicate:

> The assessment has redirected the focus of the mathematics classes toward practical application of skills.

> Students have to show work & explain - not just color bubbles. More real life content is very do-able.

> the questions are more applicable to children's lives, context helps make math meaningful true understanding can be assessed when asked for constructed response

There were twenty (20) responses indicating that some teachers like the writing and explaining that students must do, believing this more accurately reflects their understanding of the material. In this respect, one teacher writes:

> I like the idea of focusing on problem solving, and writing about it. Certainly the MAP is forcing us to go in that direction.

This correlates with the nineteen (19) teachers who like the fact that students must show and explain their work, one (1) of these teachers writes:

> I like the fact that students are asked to show their work and communicate their work.

Ten (10) responses were received that laud the assessment for admitting multiple solutions to problems, and a further eight (8) that mentioned problem solving.

In the category of "format," most responses fall into the category of the *variety* of question types on the assessment (27), e.g., multi-step, multiple choice, constructed responses, etc. Four (4) teachers mentioned the open-ended format of the questions, the same number who mentioned that, in general, they like the assessment format. Three (3) respondents wrote that the format was readable and clear.

"Scoring" was another category on which several teachers commented. We received ten (10) responses from teachers who like the fact that partial credit is given for the work students do. Three (3) teachers like the scoring guides, the same number who indicate that the assessment is challenging and engaging. Two (2) teachers responded that the assessment relates to teaching, and seven (7) teachers mentioned one of the following items each: classification, clear results, released items, incentives, some students do better, students enjoy it, and DESE allows teacher input.

In the category of general responses, ten (10) teachers indicated that they like nothing about the assessment, four (4) were unsure, one (1) liked the possibility that it will be replaced, and one (1) did not remember. Fifty-four (54) teachers did not respond to this question.

What Teachers Dislike about the MAP. Teacher dislikes, with respect to the assessment, are manifold, and do not tend to concentrate in certain areas as the positive comments do. The greatest number of negative responses related to the amount of time the assessment takes to administer (14). One teacher wrote that he or she dislikes:

> The time it takes out of teaching curriculum - I spent 5 entire class periods administering the test.

Together with this issue, two (2) responses indicated that the assessment is too long, and one (1) teacher believes that on some of its sections, more time is required.

Thirteen (13) teachers commented that there is too much reading and writing on the math assessment. An equal number (13) remarked that the results are not returned in a timely manner that would allow modifications to teaching practices. An example of each category follows:

> The amount of reading (& comprehension) necessary to complete the exam inhibits the mathematics performance. Most of my students last year could do the math, but had difficulty figuring out what was being asked. Their performance was also hindered by the fact that they thought it was "stupid" (their words) to write so much on a math test.

> I hate the time period we have to wait for the assessment results. At least with the MMAT's, we knew how our students were doing, and could make some instructional changes in our planning for the next year before going home for the present year. I'm not sure there's a good answer to this problem. Teachers are like students - we need immediate feedback on what we're doing so we can see where to plan changes, and what to keep the same. I can not stress this enough. Would really appreciate seeing some change with the speed of the feedback. Perhaps train more graders. I don't have all the answers, but the speed by which we get feedback back, is frustrating. I know that there are other 4th grade teachers that feel this way also.

Also in the area of the assessment's content, four (4) teachers commented on the unpreparedness of the students, and three (3) on what they characterize as the unclear objectives of the assessment. We received unique responses stating that the assessment was too simple, that the non-calculator part was trivial, that the assessment is culturally biased, and that there was a need to be current in the environment of this assessment.

The perception that the assessment is not aligned with the curriculum is also fairly widespread (12). Some teachers mentioned that they seem to be teaching one way for the curriculum and one way for the assessment, but are being so compelled to do so because the textbooks they use are not oriented toward performance assessment. Some teachers mentioned that their students will have trouble preparing for the standardized college entrance exams because time is being taken from that to prepare them for the MAP. On this topic, one teacher writes:

> I am a high school teacher. The new assessment program & curriculum framework is trying to make us quit teaching the traditional subjects of Algebra, Algebra II, Geometry. To incorporate the new frameworks I am having to drop many objectives that I used to teach. This will cause ACT scores to fall

Fewer numbers of teachers responded to other issues of MAP administration. We received two (2) responses on each of the following issues: that the MAP is too drastic a change made too quickly, that it wastes valuable human resources, and that there should not be an emphasis on doing better each year. Unique responses were received in the areas of reading questions aloud to the students, being insecure about the MAP's newness, dealing with parent misunderstanding, having a general problem with the test, having all 10th-grade students take the assessment, and the use of paper manipulatives.

Eleven (11) responses mention that the assessment is too difficult. Many of these responses are tied to developmental concerns, expressing the view that at the particular grade level the assessment is given, the students are unprepared to solve the types of problems presented. Additionally, there are four (4) responses that directly address the developmental non-readiness of the students.

There are sixteen (16) responses dealing with accountability, which are evenly divided between student and teacher accountability. There are those who do not like the pressure being put on the teachers to improve the test scores each year, together with those who do not think it is right that their school's accreditation be tied to student performance on the MAP. This is closely related to the comments of teachers who remark on student accountability. The assessment is not "high stakes" for the students. We are told that many students just dismiss the MAP and do not even try to do well. Thus, the teachers feel that they are caught in the middle. One teacher writes:

> The students need to be made accountable for this test. Right now they consider it a BIG JOKE!

There are additional responses dealing with the results of the assessment. Seven (7) teachers indicated that they do not like the handling of the results in general, four (4) dislike the way the assessment is scored, three (3) believe the scoring is unfair, and three (3) believe the proficiency level is too high. Other responses included a desire for either itemized results or results by teacher (3), a dislike of what a teacher perceives as not taking into account student strengths (1), a dislike of inaccuracy of the scoring (1), along with its inconsistency (1). One (1) teacher also mentioned that special district students should not be counted in the scores of a school they do not attend.

The teachers provided seventeen (17) responses that criticize the clarity of the exam. Ten (10) of these responses specifically relate to the wording of the questions on the exam, while four (4) of them are directed at the assessment directions themselves; three (3) are non-specific. We received five (5) comments each on the topics of the timing of the administration, the lack of practice, the cost, and the lack of focus on the basics. Some teachers believe that the test should be given earlier in the year, mostly to allow for the teacher to make a classroom response to the performance of the students. Some teachers would like more practice; they feel uncomfortable with the new format. Those that mention cost do not believe the assessment is cost effective. And some teachers believe that there is not enough focus on the "basic skills" in the new assessment.

Still, with respect to the format of the assessment, four (4) teachers mention the difficulty students have with flipping pages back and forth to work on problems for which the data is on another page. Three (3) believe that the most difficult question should be placed at the end, not at the beginning of a section, and we received the unique comments that the multi-step problems are too long, and that there are poor items remaining on the assessment that should have been removed.

Eight (8) responses dislike the possibility of multiple correct answers. Some of these respondents want there to be only one correct answer. We received four (4) responses that indicate a concern for at-risk and learning disabled students who take the same assessment with their classmates. The same number (4) dislike the scoring generally, while another two (2) are unhappy that the students must show their work, and another (3) feel the scoring is generally unfair.

In the category of general responses, five (5) teachers indicated that there is nothing about the new assessment they did not like, while six (6) teachers are unsure. One person indicated that the assessment program will change again, and one (1) person does not remember. Sixty-three (63) teachers did not respond to this question. The general attitude of the teachers on this question is perhaps best summed up by one of the teachers:

> The new program is a very different way of testing for students. We are having to teach math content & new test taking skills. Some of my students who have the math ability but not the communication skills may not do as well. It will just take time. I think it is worth it.

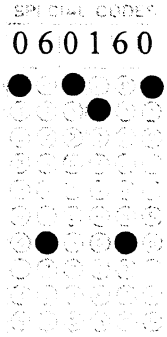
Appendices

Missouri Teacher Survey of Classroom Practices

Mathematics

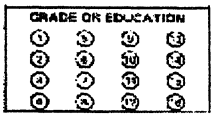
Instructions for answer sheet – Please use a #2 pencil

1. The "NAME" box on the answer sheet has been pre-coded with your district and school code numbers.



2. Please supply your birth date in the "SPECIAL CODES" area of the answer sheet in the form MMDDYY. For instance, if your birthday is on June 1, 1960, you would enter "060160" in the SPECIAL CODES box. Please note that this information is *ONLY* used for making sure you get a follow-up survey next year. It is NOT correlated with any of the other information you supply.

3. Please mark the grade (4, 8, or 10) of math you teach in the "GRADE OR EDUCATION" box on the answer sheet.



4. For all questions about classroom practices, please refer only to activities related to math instruction. **If you teach more than one math class, please select your class with the most varied levels of student ability,** then answer questions from the perspective of the selected class.

Part 1

Please respond to each of the following:

1. Are you on block scheduling for this course?
   1 = No **2 = Yes**

2. How many times per week does the class for which you are answering this survey meet?
   1 = One time **2 = Two times** **3 = Three times** **4 = Four times** **5 = Five times**

3. How long is each of these class periods?
   1 = Under 40 minutes **2 = 40-60 min.** **3 = 61-90 min.** **4 = 91-120 min.** **5 = Greater than 120 min.**

4. How often do you usually assign homework?
   1 = Never **2 = Less than 1/2 of class periods** **3 = 1/2 of class periods** **4 = More than 1/2 of class periods** **5 = Every day**

5. How many minutes do you expect your average student to spend on the homework you assign?
   1 = I don't assign any **2 = Less than 15 minutes** **3 = 15-30 minutes** **4 = 31-60 minutes** **5 = More than 60 minutes**

Please indicate which of the following types of work are expected of students *outside* of class.

1 = No **2 = Yes**

6. Read textbook.
7. Complete an independent project.
8. Complete worksheets.
9. Keep a journal.
10. Complete a group project.

How often does the average student do these things *in* class?

1 = Never **2 = Less than 1/2 of class period** **3 = 1/2 of class period** **4 = Greater than 1/2 of class** **5 = Almost all**

11. Listen to the teacher explain something.
12. Read from a textbook.
13. Maintain a portfolio of his/her own work.
14. Work in pairs or small groups.
15. Use the computer.
16. Answer questions from a textbook or worksheet.
17. Take a quiz or test.
18. Take part in whole class discussion.
19. Ask questions to improve understanding.
20. Make predictions, guesses, or hypotheses.
21. Make maps, drawings, or models to show ideas.
22. Score or grade his/her own work using a scoring guide or rubric.
23. Apply concepts discussed in class to everyday life.
24. Read about class content from sources other than textbook.
25. Write about class content.
26. Keep a journal.
27. Peer review.

ndicate the relative importance you give to each of the following in determining grades for students.

1 = Not important 2 = Somewhat not important 3 = Neutral 4 = Somewhat important 5 = Important

28. Objective tests (e.g. multiple choice, true/false).
29. Essay tests.
30. Performance tasks or events.
31. Observation of student behavior.
32. Individual projects.
33. Group projects.
34. Homework assignments.
35. Portfolios.
36. Completion of written worksheets.
37. Individual seatwork.
38. Peer review.

Indicate how well prepared you are to perform the following activities:

1 = Not well prepared 2 = Somewhat prepared 3 = Prepared 4 = Well prepared 5 = Very well prepared

39. Use cooperative learning groups.
40. Use computers as an integral part of instruction.
41. Integrate this subject with other subject areas.
42. Use a variety of assessment strategies.
43. Help students document and evaluate their work through portfolios.
44. Teach groups that vary in ability.
45. Teach students from a variety of cultural backgrounds.
46. Teach students who have limited English proficiency.
47. Teach students who have learning disabilities.
48. Encourage participation of females.
49. Involve parents in the education of their children.

Indicate the degree to which each of the following influences the content you teach in this class.

1 = No influence 2 = Little influence 3 = Moderate influence 4 = Strong influence 5 = Very strong influence

50. Missouri's education curriculum framework or guidelines.
51. Your district's curriculum framework or guidelines.
52. Textbook.
53. Missouri's State Assessment Program.
54. Education standards or curriculum guidelines from national organizations.
55. Your understanding of what motivates your students.
56. Available equipment and supplies.
57. Student aptitude.
58. Practices of other teachers.
59. Parents.

Indicate the availability and approximate number of times per semester each of the following occurs with this class:

1 = Not available 2 = Available, but not used 3 = Used weekly 4 = Used bimonthly 5 = Used monthly

60. An overhead projector is used in instruction.
61. A videotape player is used in instruction.
62. A computer is used by you in instruction.
63. A computer is used by the students.

Please rate each statement using the following scale:

1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree

64. Student work areas should be flexible to accommodate a variety of learning activities, whether it be working individually or in small groups.
65. Portfolio assessment is more useful than traditional tests.
66. Instruction should be composed of projects and centers.
67. Subject matter should be integrated into all areas of the curriculum.
68. Novel solutions to problems should be encouraged.
69. Most of teacher preparation time should be used to prepare the classroom for hands-on activities.
70. A test is the most appropriate way to gauge a student's achievement.
71. The teacher's part in the attainment of subject matter is to diagnose and correct errors.
72. Assessment should be integrated into the learning and instructional process.
73. The teacher should primarily lead whole group instruction.
74. Teachers facilitate students finding their own meaning in experiences and interpretations of their environment.
75. It is important to have numerical scores so that a student's progress can be compared to that of other students.
76. Teachers should impart knowledge to students.
77. Students should be left to choose or form their own learning goals and objectives.
78. A quiet classroom is more productive than a busy and noisy room.
79. Teachers construct the correct understanding for students.
80. Learning should consist primarily of hands-on activities.
81. Students need to learn basic skills before they can learn higher order thinking skills.
82. It is best when only one activity is taking place at one time in the classroom.
83. One of the main purposes of assessment is to gauge whether or not a student has mastered the material to know whether a student can move on to the next level of instruction.
84. Teachers and curriculum developers should decide what children learn and how they learn it.
85. Teachers should imbed subject matter in authentic experiences.
86. The best way for students to show they have mastered the subject matter is to demonstrate that knowledge.
87. Instruction should be divided into separate subject areas.
88. Instruction and assessment should be separate otherwise teaching to the test will occur.

Please rate the State Assessment Program using the following scale:

1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree

89. My overall impression of the new state assessment program is favorable.
90. The state assessment program is effective.
91. The new assessment results will be useful for instructional planning.
92. The new assessment results will be useful for addressing student needs.
93. The new assessment results will be useful for parent conferencing.

Part 2

For the following items, please answer only for the previous 12 month period.

1 = No 2 = Yes

94. Have you served on a school or district math curriculum development committee?
95. Have you served on a school district or state assessment development or selection committee?
96. Have you participated in a formal performance assessment scoring activity beyond your own classroom?

Please respond to each of the following statements:

1 = Strongly disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly agree

97. Students learn math best in classes with students of similar abilities.
98. It is important for students to learn basic math terms and formulas before learning underlying concepts and principles.
99. Laboratory-based math classes are more effective than non-laboratory classes.
100. I enjoy teaching math.
101. I feel supported by colleagues to try out new ideas in teaching math.
102. I receive support from the school administration for teaching math.
103. Math teachers in this school regularly share ideas.
104. Math teachers in this school regularly observe each other teaching classes as part of sharing and improving instruction.
105. Activity-based math experiences aren't worth the time and expense.
106. I am required to follow rules at this school that conflict with my best professional judgment about teaching and learning math.
107. Most math teachers in this school contribute actively in math curriculum development.
108. I consider myself a "master" teacher.
109. I feel that I have many opportunities to learn new things in my present job.
110. I have time during the regular school week to work with my peers on curriculum.

Indicate the availability and approximate number of times per semester each of the following occurs with this class:

1 = Not available 2 = Available, but not used 3 = Used weekly 4 = Used bimonthly 5 = Used monthly

111. Calculators are used in instruction.
112. Graphing calculators are used in instruction.
113. Manipulatives are used in instruction.
114. Electronic technology is used for spreadsheets, making graphs, or analyzing data.

If you participated in the Spring 1998 assessment, please rate the following aspects of the assessment program using this scale.

1 = Poor 2 = Fair 3 = Average 4 = Good 5 = Excellent

115. Instructions for test.
116. Test materials.
117. Amount of time needed for test preparation and administration.
118. Timeliness of results.
119. Format.

Thank you for your participation.

Please place the following items in your survey packet envelope:

- ☐ **Completed Parts 1 and 2 on scantron answer sheet**
- ☐ **Completed Part 3 on insert sheet**

and return the sealed packet to your principal, who will relay it to us.

Department of Educational and Counseling Psychology
University of Missouri - Columbia
16 Hill Hall
Columbia, MO 65211

PART 3

Section 1 – Units

Please circle the skill emphases of your current unit: (You may circle more than one response.)

1. Multiplication
2. Division
3. Decimals
4. Fractions
5. General math
6. Pre-algebra
7. Algebra I
8. Algebra II
9. Trigonometry
10. Geometry
11. Integrated curriculum (across discipline)
12. Other (please specify): _____

Please circle the length of your current unit:

1. One week
2. Two – three weeks
3. One month
4. More than one month

Section 2 - Distribution of class time in current unit:

Please enter the percentage of time for each item in the box provided so that items a-e total 100%.

Activity	Percentage of class time
a. Management or administrative routine, interruptions, and other non-instructional activities.	
b. Teacher-led whole class discussion.	
c. Individual student work: reading textbooks, completing worksheets, etc.	
d. Small group work.	
e. Other (please describe):_____	
Total	**100%**

Section 3 – Open questions

Please use space provided to answer the following questions.

1. What types of professional development would you need to better understand and use the results of the new assessment?

2. Which aspects do you like most about the new assessment program?

3. Which aspects do you like least about the new assessment program, and how would you change them?

APPENDIX B: SUMMARY DATA TABLES

PART I:

SCHEDULING

Table 1. Total Sample: Percents for Responses, Questions 1 through 5

Question	1	2	n
1	69.8	30.2	222

	1	2	3	4	5	n
2	0.0	3.2	16.5	4.6	75.7	218
3	1.8	67.9	27.6	2.7	0.0	221
4	2.7	20.3	9.5	35.6	32.0	222
5	2.7	14.4	63.5	18.5	0.9	222

SCHEDULING BY GRADE

Table 2. Percents for Responses, Questions 1 through 5

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	n				1	2	n				1	2	n			
1	94.34	5.66	106				69.57	30.43	46				32.86	67.14	70			

	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
2	0.00	0.00	0.00	4.72	95.28	106	0.00	4.35	15.22	2.17	78.26	46	0.00	7.58	43.94	6.06	42.42	66
3	3.77	82.08	14.15	0.00	0.00	106	0.00	80.43	19.57	0.00	0.00	46	0.00	37.68	53.62	8.70	0.00	69
4	3.77	36.79	13.21	34.91	11.32	106	0.00	4.35	10.87	43.48	41.30	46	2.86	5.71	2.86	31.43	57.14	70
5	3.77	23.58	65.09	6.60	0.94	106	0.00	6.52	73.91	17.39	2.17	46	2.86	5.71	54.29	37.14	0.00	70

SCHEDULING BY GEOGRAPHIC REGION

Table 3. Percents for Responses, Questions 1 through 5

	URBAN						SUBURBAN						RURAL					
	1		2		n		1		2		n		1		2		n	
Question																		
1	44.44		55.56		9		72.08		27.92		154		67.80		32.20		59	
	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
2	0.00	0.00	22.22	0.00	77.78	9	0.00	2.63	15.79	5.92	75.66	152	0.00	5.26	17.54	1.75	75.44	57
3	0.00	66.67	33.33	0.00	0.00	9	1.96	68.63	25.49	3.92	0.00	153	1.69	66.10	32.20	0.00	0.00	59
4	0.00	33.33	11.11	22.22	33.33	9	3.25	20.78	9.09	34.42	32.47	154	1.69	16.59	10.17	40.68	30.51	59
5	0.00	11.11	55.56	22.22	11.11	9	3.25	13.64	66.23	16.23	0.65	154	1.69	16.95	57.63	23.73	0.00	59

SCHEDULING BY PILOT/NON-PILOT

Table 4. Percents for Responses, Questions 1 through 5

	PILOT						NON-PILOT					
	1		2		n		1		2		n	
Question												
1	64.84		35.16		128		76.60		23.40		94	
	1	2	3	4	5	n	1	2	3	4	5	n
2	0.00	4.80	17.60	5.60	72.00	125	0.00	1.08	15.05	3.23	80.65	93
3	0.00	62.20	36.22	1.57	0.00	127	4.26	75.53	15.96	4.26	0.00	94
4	3.91	19.53	9.38	32.81	34.38	128	1.06	21.28	9.57	39.36	28.72	94
5	3.91	14.84	60.16	19.53	1.56	128	1.06	13.83	68.09	17.02	0.00	94

HOMEWORK

Table 5. Total Sample: Percents for Responses, Questions 6 through 10

	1	2	n
Question			
6	61.5	38.5	221
7	34.8	65.2	221
8	9.0	91.0	221
9	85.9	14.1	220
10	77.2	22.8	219

HOMEWORK BY GRADE

Table 6. Percents for Responses, Questions 6 through 10

	GRADE 4			GRADE 8			GRADE 10		
Question	1	2	n	1	2	n	1	2	n
6	74.53	25.47	106	47.83	52.17	46	50.72	49.28	69
7	30.19	69.81	106	26.09	73.91	46	47.83	52.17	69
8	10.38	89.62	106	10.87	89.13	46	5.80	94.20	69
9	84.91	15.09	106	93.48	6.52	46	82.35	17.65	68
10	78.09	21.90	105	71.74	28.26	46	79.41	20.59	68

HOMEWORK BY GEOGRAPHIC REGION

Table 7. Percents for Responses, Questions 6 through 10

	URBAN			SUBURBAN			RURAL		
Question	1	2	n	1	2	n	1	2	n
6	22.22	77.78	9	63.40	36.60	153	62.71	37.29	59
7	22.22	77.78	9	34.64	65.36	153	37.29	62.71	59
8	22.22	77.78	9	7.19	92.81	153	11.86	88.14	59
9	66.67	33.33	9	87.50	12.50	152	84.75	15.25	59
10	66.67	33.33	9	79.47	20.53	151	72.88	27.12	59

HOMEWORK BY PILOT/NON-PILOT

Table 8. Percents for Responses, Questions 6 through 10

	PILOT			NON-PILOT		
Question	1	2	n	1	2	n
6	59.06	40.94	127	64.89	35.11	94
7	37.01	62.99	127	31.91	68.09	94
8	11.81	88.19	127	5.32	94.68	94
9	85.83	14.17	127	86.02	13.98	93
10	77.78	22.22	126	76.34	23.66	93

INSTRUCTIONAL PRACTICES

Table 9. Total Sample: Percents for Responses, Questions 11 through 27

Question	1	2	3	4	5	n
11	0.0	50.5	31.5	9.5	8.6	222
12	21.6	71.2	3.6	1.8	1.8	222
13	49.1	37.7	3.6	2.3	7.3	220
14	3.2	50.0	33.3	10.8	2.7	222
15	48.2	47.7	2.7	0.9	0.5	222
16	0.5	51.8	24.3	17.6	5.9	222
17	0.5	71.2	12.8	7.3	8.2	219
18	0.5	55.9	29.7	9.0	5.0	222
19	0.5	47.3	29.3	13.5	9.5	222
20	3.2	63.5	22.5	8.1	2.7	222
21	8.6	63.5	20.7	4.5	2.7	222
22	31.1	56.3	9.0	1.8	1.8	222
23	1.8	62.0	23.5	8.6	4.1	221
24	36.7	54.3	5.4	2.3	1.4	221
25	35.7	50.2	9.5	2.3	2.3	221
26	62.9	25.3	5.4	1.8	4.5	221
27	32.0	57.2	8.1	1.4	1.4	222

INSTRUCTIONAL PRACTICES BY GRADE

Table 10. Percents for Responses, Questions 11 through 27

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
11	0.00	48.11	33.02	10.38	8.49	106	0.00	58.70	23.91	10.87	6.52	46	0.00	48.57	34.29	7.14	10.00	70
12	14.15	73.58	6.60	1.89	3.77	106	26.09	69.57	0.00	4.35	0.00	46	30.00	68.57	1.43	0.00	0.00	70
13	56.19	31.43	3.81	0.95	7.62	105	39.13	45.65	6.52	2.17	6.52	46	44.93	42.03	1.45	4.35	7.25	69
14	3.77	46.23	32.08	14.15	3.77	106	0.00	60.87	30.43	8.70	0.00	46	4.29	48.57	37.14	7.14	2.86	70
15	43.40	50.00	4.72	0.94	0.94	106	43.48	56.52	0.00	0.00	0.00	46	58.57	38.57	1.43	1.43	0.00	70
16	0.00	47.17	30.19	16.04	6.60	106	2.17	54.35	15.22	21.74	6.52	46	0.00	57.14	21.43	17.14	4.29	70
17	0.00	83.02	9.43	1.89	5.66	106	0.00	62.22	15.56	15.56	6.67	45	1.47	58.82	16.18	10.29	13.24	68
18	0.00	44.34	35.85	13.21	6.60	106	0.00	63.04	26.09	8.70	2.17	46	1.43	68.57	22.86	2.86	4.29	70
19	0.94	46.23	32.08	7.55	13.21	106	0.00	50.00	28.26	13.04	8.70	46	0.00	47.14	25.71	22.86	4.29	70
20	1.89	57.55	23.58	12.26	4.72	106	2.17	69.57	26.09	2.17	0.00	46	5.71	68.57	18.57	5.71	1.43	70
21	4.72	55.66	29.25	6.60	3.77	106	8.70	71.74	17.39	2.17	0.00	46	14.29	70.00	10.00	2.86	2.86	70
22	26.42	58.49	11.32	1.89	1.89	106	21.74	58.70	13.04	4.35	2.17	46	44.29	51.43	2.86	0.00	1.43	70
23	1.89	55.66	25.47	8.49	8.49	106	0.00	60.87	21.74	17.39	0.00	46	2.90	72.46	21.74	2.90	0.00	69
24	17.92	68.87	7.55	3.77	1.89	106	45.65	50.00	4.35	0.00	0.00	46	59.42	34.78	2.90	1.45	1.45	69
25	20.75	57.55	13.21	3.77	4.72	106	45.65	50.00	4.35	0.00	0.00	46	52.17	39.13	7.25	1.45	0.00	69
26	44.34	39.62	9.43	2.83	3.77	106	80.43	15.22	2.17	0.00	2.17	46	79.71	10.14	1.45	1.45	7.25	69
27	21.70	65.09	8.49	1.89	2.83	106	34.78	58.70	4.35	2.17	0.00	46	45.71	44.29	10.00	0.00	0.00	70

INSTRUCTIONAL PRACTICES BY REGION

Table 11. Percents for Responses, Questions 11 through 27

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
11	0.00	77.78	11.11	0.00	11.11	9	0.00	47.40	33.77	9.74	9.09	154	0.00	54.24	28.81	10.17	6.78	59
12	11.11	88.89	0.00	0.00	0.00	9	23.38	70.13	2.60	1.95	1.95	154	18.64	71.19	6.78	1.69	1.69	59
13	0.00	44.44	22.22	0.00	33.33	9	53.29	34.87	2.63	3.29	5.92	152	45.76	44.07	3.39	0.00	6.78	59
14	0.00	33.33	33.33	22.22	11.11	9	1.30	50.00	36.36	10.39	1.95	154	8.47	52.54	25.42	10.17	3.39	59
15	44.44	55.56	0.00	0..00	0.00	9	48.05	48.05	2.60	0.65	0.65	154	49.15	45.76	3.39	1.69	0.00	59
16	0.00	66.67	22.22	0.00	11.11	9	0.65	54.55	23.38	16.23	5.19	154	0.00	42.37	27.12	23.73	6.78	59
17	0.00	77.78	22.22	0.00	0.00	9	0.66	73.68	10.53	6.58	8.55	152	0.00	63.79	17.24	10.34	8.62	58
18	0.00	44.44	33.33	11.11	11.11	9	0.65	56.49	29.87	9.09	3.90	154	0.00	55.93	28.81	8.47	6.78	59
19	0.00	33.33	33.33	11.11	22.22	9	0.00	50.00	26.62	14.94	8.44	154	1.69	42.37	35.59	10.17	10.17	59
20	0.00	22.22	55.56	22.22	0.00	9	2.60	68.18	20.78	6.49	1.95	154	5.08	57.63	22.03	10.17	5.08	59
21	0.00	44.44	44.44	11.11	0.00	9	8.44	64.29	20.78	2.60	3.90	154	10.17	64.41	16.95	8.47	0.00	59
22	11.11	33.33	22.22	0.00	33.33	9	31.82	58.44	7.14	1.95	0.65	154	32.20	54.24	11.86	1.69	0.00	59
23	0.00	33.33	33.33	11.11	22.22	9	1.31	62.75	20.92	11.11	3.92	153	3.39	64.41	28.81	1.69	1.69	59
24	0.00	66.67	0.00	11.11	22.22	9	37.25	55.56	5.23	1.96	0.00	153	40.68	49.15	6.78	1.69	1.69	59
25	22.22	33.33	11.11	11.11	22.22	9	33.99	52.29	9.80	1.96	1.96	153	42.37	47.46	8.47	1.69	0.00	59
26	44.44	11.11	11.11	0.00	33.33	9	62.09	25.49	5.88	2.61	3.92	153	67.80	27.12	3.39	0.00	1.69	59
27	22.22	44.44	11.11	0.00	22.22	9	34.42	57.79	5.84	1.30	0.65	154	27.12	57.63	13.56	1.69	0.00	59

INSTRUCTIONAL PRACTICES BY PILOT/NON-PILOT

Table 12. Percents for Responses, Questions 11 through 27

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
11	0.00	53.13	30.47	7.81	8.59	128	0.00	46.81	32.98	11.70	8.51	94
12	21.88	73.44	3.13	1.56	0.00	128	21.28	68.09	4.26	2.13	4.26	94
13	48.44	38.28	3.13	1.56	8.59	128	50.00	36.96	4.35	3.26	5.43	92
14	1.56	50.78	32.03	12.50	3.13	128	5.32	48.94	35.11	8.51	2.13	94
15	49.22	46.88	1.56	1.56	0.78	128	46.81	48.94	4.26	0.00	0.00	94
16	0.78	53.13	25.78	14.06	6.25	128	0.00	50.00	22.34	22.34	5.32	94
17	0.00	70.63	13.49	7.14	8.73	126	1.08	72.04	11.83	7.53	7.53	93
18	0.78	63.28	21.88	8.59	5.47	128	0.00	45.74	40.43	9.57	4.26	94
19	0.78	46.88	29.69	12.50	10.16	128	0.00	47.87	28.72	14.89	8.51	94
20	2.34	64.84	21.09	7.81	3.91	128	4.26	61.70	24.47	8.51	1.06	94
21	8.59	63.28	19.53	6.25	2.34	128	8.51	63.83	22.34	2.13	3.19	94
22	27.34	59.38	8.59	2.34	2.34	128	36.17	52.13	9.57	1.06	1.06	94
23	0.78	64.06	25.00	6.25	3.91	128	3.23	59.14	21.51	11.83	4.30	93
24	38.28	51.56	4.69	3.13	2.34	128	34.41	58.06	6.45	1.08	0.00	93
25	35.94	47.66	10.16	3.13	3.13	128	35.48	53.76	8.60	1.08	1.08	93
26	67.97	19.53	4.69	3.13	4.69	128	55.91	33.33	6.45	0.00	4.30	93
27	28.13	58.59	9.38	1.56	2.34	128	37.23	55.32	6.38	1.06	0.00	94

GRADING PRACTICES

Table 13. Total Sample: Percents for Responses, Questions 28 through 38

Question	1	2	3	4	5	n
28	12.6	17.1	16.2	32.4	21.6	222
29	25.2	15.3	19.8	31.5	8.1	222
30	0.9	5.0	10.8	48.2	35.1	222
31	8.6	12.6	20.7	35.1	23.0	222
32	10.9	12.2	19.0	42.1	15.8	221
33	13.5	14.9	25.7	35.6	10.4	222
34	2.7	5.4	11.3	55.0	25.7	222
35	30.6	13.1	27.9	22.1	6.3	222
36	2.3	7.7	19.8	48.2	22.1	222
37	2.3	9.0	17.1	50.9	20.7	222
38	26.1	19.8	26.1	23.9	4.1	222

GRADING PRACTICES BY GRADE

Table 14. Percents for Responses, Questions 28 through 38

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
28	8.49	9.43	18.87	39.62	23.58	106	13.04	28.26	17.39	17.39	23.91	46	18.57	21.43	11.43	31.43	17.14	70
29	16.04	14.15	19.81	40.57	9.43	106	28.26	23.91	26.09	19.57	2.17	46	37.14	11.43	15.71	25.71	10.00	70
30	1.89	4.72	6.60	43.40	43.40	106	0.00	6.52	10.87	56.52	26.09	46	0.00	4.29	17.14	50.00	28.57	70
31	0.00	10.38	16.04	34.91	38.68	106	13.04	17.39	13.04	50.00	6.52	46	18.57	12.86	32.86	25.71	10.00	70
32	8.57	11.43	16.19	47.62	16.19	105	6.52	10.87	13.04	54.35	15.22	46	17.14	14.29	27.14	25.71	15.71	70
33	11.32	12.26	23.58	39.62	13.21	106	6.52	13.04	32.61	41.30	6.52	46	21.43	20.00	24.29	25.71	8.57	70
34	3.77	6.60	16.04	51.89	21.70	106	0.00	4.35	2.17	67.39	26.09	46	2.86	4.29	10.00	51.43	31.43	70
35	23.58	15.09	30.19	23.58	7.55	106	39.13	10.87	21.74	23.91	4.35	46	35.71	11.43	28.57	18.57	5.71	70
36	1.89	2.83	20.75	50.94	23.58	106	4.35	10.87	26.09	39.13	19.57	46	1.43	12.86	14.29	50.00	21.43	70
37	0.00	4.72	16.04	55.66	23.58	106	4.35	10.87	28.26	45.65	10.87	46	4.29	14.29	11.43	47.14	22.86	70
38	17.92	18.87	31.13	26.42	5.66	106	28.26	23.91	21.74	26.09	0.00	46	37.14	18.57	21.43	18.57	4.29	70

GRADING PRACTICES BY GEOGRAPHIC REGION

Table 15. Percents for Responses, Questions 28 through 38

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
28	22.22	22.22	11.11	33.33	11.11	9	11.69	19.48	16.23	30.52	22.08	154	13.56	10.17	16.95	37.29	22.03	59
29	11.11	11.11	44.44	22.22	11.11	9	24.68	14.94	18.83	35.06	6.49	154	28.81	16.95	18.64	23.73	11.86	59
30	0.00	0.00	11.11	44.44	44.44	9	1.30	5.19	9.74	45.45	38.31	154	0.00	5.08	13.56	55.93	25.43	59
31	0.00	33.33	0.00	22.22	44.44	9	7.79	9.74	23.38	36.36	22.73	154	11.86	16.95	16.95	33.90	20.34	59
32	0.00	11.11	11.11	33.33	44.44	9	11.11	13.07	15.69	44.44	15.69	153	11.86	10.17	28.81	37.29	11.86	59
33	0.00	11.11	11.11	44.44	33.33	9	14.94	15.58	23.38	37.01	9.09	154	11.86	13.56	33.90	30.51	10.17	59
34	0.00	22.22	0.00	22.22	55.56	9	3.90	5.19	11.69	57.79	21.43	154	0.00	3.39	11.86	52.54	32.20	59
35	0.00	0.00	11.11	33.33	55.56	9	33.12	12.99	27.27	22.73	3.90	154	28.81	15.25	32.20	18.64	5.08	59
36	22.22	0.00	44.44	22.22	11.11	9	1.95	7.79	20.13	49.35	20.78	154	0.00	8.47	15.25	49.15	27.12	59
37	0.00	22.22	22.22	44.44	11.11	9	3.25	8.44	16.23	51.30	20.78	154	0.00	8.47	18.64	50.85	22.03	59
38	11.11	11.11	22.22	33.33	22.22	9	25.97	22.08	27.27	20.78	3.90	154	28.81	15.25	23.73	30.51	1.69	59

GRADING PRACTICES BY PILOT/NON-PILOT

Table 16. Percents for Responses, Questions 28 through 38

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
28	12.50	21.88	15.63	29.69	20.31	128	12.77	10.64	17.02	36.17	23.40	94
29	24.22	16.41	20.31	32.03	7.03	128	26.60	13.83	19.15	30.85	9.57	94
30	0.78	3.13	8.59	53.13	34.38	128	1.06	7.45	13.83	41.49	36.17	94
31	10.16	10.94	20.31	34.38	24.22	128	6.38	14.89	21.28	36.17	21.28	94
32	10.94	10.94	18.75	41.41	17.97	128	10.75	13.98	19.35	43.01	12.90	93
33	14.06	10.16	25.00	39.06	11.72	128	12.77	21.28	26.60	30.85	8.51	94
34	3.91	6.25	11.72	53.13	25.00	128	1.06	4.26	10.64	57.45	26.60	94
35	28.91	12.50	27.34	23.44	7.81	128	32.98	13.83	28.72	20.21	4.26	94
36	3.13	5.47	25.00	46.09	20.31	128	1.06	10.64	12.77	51.06	24.47	94
37	2.34	8.59	17.19	52.34	19.53	128	2.13	9.57	17.02	48.94	22.34	94
38	21.09	21.88	27.34	24.22	5.47	128	32.98	17.02	24.47	23.40	2.13	94

TEACHER PREPARATION

Table 17. Total Sample: Percents for Responses, Questions 39 through 49

Question	1	2	3	4	5	n
39	2.3	13.6	29.9	32.6	21.7	221
40	23.0	30.2	22.5	17.6	6.8	222
41	5.4	25.2	30.6	26.6	12.2	222
42	0.5	21.6	31.1	34.2	12.6	222
43	34.7	31.1	19.4	10.8	4.1	222
44	4.5	11.3	32.0	31.1	21.2	222
45	14.0	18.9	27.5	26.1	13.5	222
46	45.9	26.1	15.8	10.4	1.8	222
47	7.2	23.9	27.5	26.1	15.3	222
48	0.5	2.3	15.8	40.1	41.4	222
49	2.7	10.4	34.2	33.3	19.4	222

TEACHER PREPARATION BY GRADE

Table 18. Percents for Responses, Questions 39 through 49

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
39	0.94	6.60	25.47	35.85	31.13	106	2.22	22.22	33.33	28.89	13.33	45	4.29	18.57	34.29	30.00	12.86	70
40	19.81	32.08	20.75	18.87	8.49	106	21.74	39.13	17.39	17.39	4.35	46	28.57	21.43	28.57	15.71	5.71	70
41	0.94	18.87	29.25	33.02	17.92	106	2.17	26.09	34.78	26.09	10.87	46	14.29	34.29	30.00	17.14	4.29	70
42	0.94	16.98	27.36	35.85	18.87	106	0.00	21.74	28.26	39.13	10.87	46	0.00	28.57	38.57	28.57	4.29	70
43	30.19	31.13	16.98	17.92	3.77	106	36.96	34.78	21.74	4.35	2.17	46	40.00	28.57	21.43	4.29	5.71	70
44	1.89	6.60	27.36	33.02	31.13	106	6.52	15.22	36.96	28.26	13.04	46	7.14	15.71	35.71	30.00	11.43	70
45	14.15	20.75	19.81	28.30	16.98	106	13.04	19.57	41.30	13.04	13.04	46	14.29	15.71	30.00	31.43	8.57	70
46	50.00	20.75	14.15	13.21	1.89	106	39.13	26.09	21.74	10.87	2.17	46	44.29	34.29	14.29	5.71	1.43	70
47	1.89	17.92	24.53	34.91	20.75	106	13.04	19.57	36.96	15.22	15.22	46	11.43	35.71	25.71	20.00	7.14	70
48	0.00	2.83	15.09	32.08	50.00	106	2.17	0.00	15.22	47.83	34.78	46	0.00	2.86	17.14	47.14	32.86	70
49	2.83	8.49	22.64	35.85	30.19	106	0.00	10.87	45.65	36.96	6.52	46	4.29	12.86	44.29	27.14	11.43	70

TEACHER PREPARATION BY GEOGRAPHIC REGION

Table 19. Percents for Responses, Questions 39 through 49

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
39	0.00	0.00	33.33	44.44	22.22	9	1.31	12.42	28.10	35.95	22.22	153	5.08	18.64	33.90	22.03	20.34	59
40	22.22	33.33	0.00	44.44	0.00	9	22.73	27.92	25.32	17.53	6.49	154	23.73	35.59	18.64	13.56	8.47	59
41	0.00	11.11	22.22	44.44	22.22	9	4.55	27.27	31.17	23.38	13.64	154	8.47	22.03	30.51	32.20	6.78	59
42	0.00	0.00	11.11	77.78	11.11	9	0.65	22.73	31.82	30.52	14.29	154	0.00	22.03	32.20	37.29	8.47	59
43	0.00	11.11	22.22	44.44	22.22	9	35.06	31.82	20.13	10.39	2.60	154	38.98	32.20	16.95	6.78	5.08	59
44	11.11	0.00	22.22	66.67	0.00	9	3.90	12.99	32.47	26.62	24.03	154	5.08	8.47	32.20	37.29	16.95	59
45	22.22	0.00	0.00	66.67	11.11	9	11.04	18.83	30.52	24.68	14.94	154	20.34	22.03	23.73	23.73	10.17	59
46	11.11	33.33	22.22	33.33	0.00	9	45.45	27.92	16.88	8.44	1.30	154	52.54	20.34	11.86	11.86	3.39	59
47	11.11	22.22	22.22	33.33	11.11	9	7.14	22.08	27.27	26.62	16.88	154	6.78	28.81	28.81	23.73	11.86	59
48	0.00	0.00	22.22	33.33	44.44	9	0.65	1.95	16.23	36.36	44.81	154	0.00	3.39	13.56	50.85	32.20	59
49	0.00	0.00	11.11	77.78	11.11	9	1.95	11.69	35.06	31.17	20.13	154	5.08	8.47	35.59	32.20	18.64	59

TEACHER PREPARATION BY PILOT/NON-PILOT

Table 20. Percent for Responses, Questions 39 through 49

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
39	0.79	13.39	26.77	33.07	25.98	127	4.26	13.83	34.04	31.91	15.96	94
40	23.44	31.25	18.75	19.53	7.03	128	22.34	28.72	27.66	14.89	6.38	94
41	5.47	23.44	31.25	25.78	14.06	128	5.32	27.66	29.79	27.66	9.57	94
42	0.00	21.88	28.91	32.81	16.41	128	1.06	21.28	34.04	36.17	7.45	94
43	33.59	26.56	24.22	11.72	3.91	128	36.17	37.23	12.77	9.57	4.26	94
44	3.91	12.50	31.25	32.03	20.31	128	5.32	9.57	32.98	29.79	22.34	94
45	10.94	20.31	27.34	25.78	15.63	128	18.09	17.02	27.66	26.60	10.64	94
46	42.97	27.34	17.97	10.94	0.78	128	50.00	24.47	12.77	9.57	3.19	94
47	6.25	25.00	26.56	27.34	14.84	128	8.51	22.34	28.72	24.47	15.96	94
48	0.78	2.34	16.41	39.06	41.41	128	0.00	2.13	14.89	41.49	41.49	94
49	2.34	10.94	36.72	33.59	16.41	128	3.19	9.57	30.85	32.98	23.40	94

INSTRUCTIONAL INFLUENCES

Table 21. Total Sample: Percents for Responses, Questions 50 through 59

Question	1	2	3	4	5	n
50	1.4	1.8	23.1	41.6	32.1	221
51	0.9	2.7	9.9	41.9	44.6	222
52	2.7	16.2	38.3	32.4	10.4	222
53	1.4	5.0	22.1	39.6	32.0	222
54	5.4	22.5	41.4	22.5	8.1	222
55	0.5	3.2	29.3	43.2	23.9	222
56	2.7	9.0	40.3	35.7	12.2	221
57	0.9	7.7	36.9	41.4	13.1	222
58	9.0	30.2	41.4	17.1	2.3	222
59	11.7	42.3	34.7	9.9	1.4	222

INSTRUCTIONAL INFLUENCES BY GRADE

Table 22. Percents for Responses, Questions 50 through 59

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
50	0.00	2.83	12.26	41.51	43.40	106	0.00	2.17	34.78	32.61	30.43	46	4.35	0.00	31.88	47.83	15.94	69
51	0.94	1.89	8.49	31.13	57.55	106	0.00	4.35	13.04	43.48	39.13	46	1.43	2.86	10.00	57.14	28.57	70
52	4.72	17.92	39.62	28.30	9.43	106	0.00	19.57	32.61	36.96	10.87	46	1.43	11.43	40.00	35.71	11.43	70
53	0.84	1.89	16.98	33.96	46.23	106	0.00	2.17	26.09	43.48	28.26	46	2.86	11.43	27.14	45.71	12.86	70
54	7.55	27.36	45.28	10.38	9.43	106	2.17	17.39	39.13	34.78	6.52	46	4.29	18.57	37.14	32.86	7.14	70
55	0.94	1.89	24.53	36.79	35.85	106	0.00	2.17	28.26	56.52	13.04	46	0.00	5.71	37.14	44.29	12.86	70
56	0.00	10.48	39.05	35.24	15.24	105	6.52	10.87	34.78	32.61	15.22	46	4.29	5.71	45.71	38.57	5.71	70
57	0.94	8.49	33.96	37.74	18.87	106	0.00	8.70	34.78	50.00	6.52	46	1.43	5.71	42.86	41.43	8.57	70
58	9.43	32.08	38.68	16.98	2.83	106	10.87	30.43	43.48	15.22	0.00	46	7.14	27.14	44.29	18.57	2.86	70
59	8.49	37.74	37.74	14.15	1.89	106	13.04	54.35	23.91	6.52	2.17	46	15.71	41.43	37.14	5.71	0.00	70

INSTRUCTIONAL INFLUENCES BY GEOGRAPHIC REGION

Table 23. Percents for Responses, Questions 50 through 59

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
50	0.00	0.00	0.00	44.44	55.56	9	1.31	1.31	24.18	44.44	28.76	153	1.69	3.39	23.73	33.90	37.29	59
51	0.00	0.00	0.00	44.44	55.56	9	0.65	2.60	11.69	44.16	40.91	154	1.69	3.39	6.78	35.59	52.54	59
52	0.00	33.33	44.44	22.22	0.00	9	2.60	16.23	37.01	31.82	12.34	154	3.39	13.56	40.68	35.59	6.78	59
53	0.00	0.00	22.22	33.33	44.44	9	1.95	5.84	22.08	38.96	31.17	154	0.00	3.39	22.03	42.37	32.20	59
54	0.00	0.00	22.22	44.44	33.33	9	3.90	21.43	43.51	24.03	7.14	154	10.17	28.81	38.98	15.25	6.78	59
55	0.00	0.00	11.11	55.56	33.33	9	0.00	2.60	26.62	45.45	25.32	154	1.69	5.08	38.98	35.59	18.64	59
56	0.00	0.00	22.22	44.44	33.33	9	1.31	9.80	41.18	37.25	10.46	153	6.78	8.47	40.68	30.51	13.56	59
57	0.00	22.22	33.33	44.44	0.00	9	0.00	7.14	34.42	44.81	13.64	154	3.39	6.78	44.07	32.20	13.56	59
58	11.11	22.22	11.11	33.33	22.22	9	6.49	31.17	41.56	18.83	1.95	154	15.25	28.81	45.76	10.17	0.00	59
59	11.11	22.22	22.22	33.33	11.11	9	10.39	45.45	36.36	7.14	0.65	154	15.25	37.29	32.20	13.56	1.69	59

INSTRUCTIONAL INFLUENCES BY PILOT/NON-PILOT

Table 24. Percents for Responses, Questions 50 through 59

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
50	0.79	1.57	20.47	46.46	30.71	127	2.13	2.13	26.60	35.11	34.04	94
51	0.78	3.13	9.38	41.41	45.31	128	1.06	2.13	10.64	42.55	43.62	94
52	1.56	18.75	42.19	30.47	7.03	128	4.26	12.77	32.98	35.11	14.89	94
53	1.56	1.56	21.09	43.75	32.03	128	1.06	9.57	23.40	34.04	31.91	94
54	5.47	18.75	39.84	26.56	9.38	128	5.32	27.66	43.62	17.02	6.38	94
55	0.78	3.91	31.25	44.53	19.53	128	0.00	2.13	26.60	41.49	29.79	94
56	0.79	9.45	40.16	37.01	12.60	127	5.32	8.51	40.43	34.04	11.70	94
57	0.78	7.03	40.63	39.84	11.72	128	1.06	8.51	31.91	43.62	14.89	94
58	6.25	32.03	38.28	21.09	2.34	128	12.77	27.66	45.74	11.70	2.13	94
59	7.81	46.88	32.03	11.72	1.56	128	17.02	36.17	38.30	7.45	1.06	94

COMPUTERS AND TECHNOLOGY

Table 25. Total Sample: Percents for Responses, Questions 60 through 63

Question	1	2	3	4	5	n
60	1.8	8.6	71.6	9.9	8.1	222
61	7.2	52.7	5.4	13.5	21.2	222
62	24.3	36.0	18.5	8.6	12.6	222
63	23.5	24.9	33.9	7.2	10.4	221

COMPUTERS AND TECHNOLOGY BY GRADE

Table 26. Percents for Responses, Questions 60 through 63

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
60	1.89	3.77	74.53	12.26	7.55	106	2.17	10.87	76.09	6.52	4.35	46	1.43	14.29	64.29	8.57	11.43	70
61	6.60	37.74	9.43	18.87	27.36	106	4.35	65.22	0.00	13.04	17.39	46	10.00	67.14	2.86	5.71	14.29	70
62	22.64	30.19	28.30	9.43	9.43	106	19.57	41.30	8.70	10.87	19.57	46	30.00	41.43	10.00	5.71	12.86	70
63	14.15	14.15	61.32	5.66	4.72	106	22.22	37.78	8.89	11.11	20.00	45	38.57	32.86	8.57	7.14	12.86	70

COMPUTERS AND TECHNOLOGY BY GEOGRAPHIC REGION

Table 27. Percents for Responses, Questions 60 through 63

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
60	0.00	0.00	100.0	0.00	0.00	9	1.30	7.14	72.73	9.09	9.74	154	3.39	13.56	64.41	16.56	5.08	59
61	11.11	44.44	0.00	22.22	22.22	9	7.14	55.19	3.90	12.99	20.78	154	6.78	47.46	10.17	13.56	22.03	59
62	11.11	33.33	44.44	0.00	11.11	9	27.27	33.77	17.53	8.44	12.99	154	18.64	42.37	16.95	10.17	11.86	59
63	11.11	33.33	44.44	0.00	11.11	9	24.84	24.84	32.68	7.19	10.46	153	22.03	23.73	35.59	8.47	10.17	59

COMPUTERS AND TECHNOLOGY BY PILOT/NON-PILOT

Table 28. Percents for Responses, Questions 60 through 63

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
60	2.34	4.69	78.91	7.03	7.03	128	1.06	13.83	61.70	13.83	9.57	94
61	6.25	51.56	5.47	12.50	24.22	128	8.51	54.26	5.32	14.89	17.02	94
62	20.31	34.38	20.31	7.81	17.19	128	29.79	38.30	15.96	9.57	6.38	94
63	22.83	26.77	33.86	3.94	12.60	127	24.47	22.34	34.04	11.70	7.45	94

TEACHER BELIEFS

Table 29. Total Sample: Means for Responses, Questions 64 through 88

Question	Mean	SD	n
64	4.33	0.83	221
65	2.72	0.89	221
66	3.01	0.83	220
67	3.89	0.69	220
68	4.19	0.68	221
69	3.25	0.89	221
70	2.96	0.84	220
71	2.91	0.89	220
72	4.05	0.61	221
73	2.99	0.83	221
74	3.78	0.74	221
75	2.99	0.94	221
76	3.69	0.78	221
77	2.26	0.76	221
78	2.49	0.94	221
79	2.95	0.82	219
80	3.02	0.82	221
81	3.54	1.09	221
82	2.68	0.83	221
83	3.71	0.74	221
84	3.23	0.94	220
85	3.91	0.62	221
86	4.12	0.55	221
87	2.79	0.82	221
88	2.57	0.89	220

TEACHER BELIEFS BY GRADE

Table 30. Means for Responses, Questions 64 through 88

	GRADE 4			GRADE 8			GRADE 10		
Question	Mean	SD	n	Mean	SD	n	Mean	SD	n
64	4.52	0.80	103	4.36	0.71	45	4.04	0.86	67
65	3.03	0.86	103	2.51	0.70	45	2.43	0.82	67
66	3.23	0.84	103	3.04	0.60	45	2.67	0.79	67
67	4.06	0.71	103	3.80	0.69	45	3.73	0.57	67
68	4.33	0.71	103	4.04	0.71	45	4.09	0.60	67
69	3.51	0.90	103	3.11	0.75	45	3.02	0.90	67
70	2.68	0.77	103	3.07	0.84	45	3.27	0.83	67
71	2.87	0.92	103	3.00	0.80	45	2.90	0.89	67
72	4.23	0.58	103	3.93	0.69	45	3.87	0.49	67
73	2.89	0.83	103	2.98	0.81	45	3.15	0.80	67
74	4.00	0.0.71	103	3.67	0.77	45	3.54	.068	67
75	2.77	0.95	103	3.11	0.94	45	3.18	0.83	67
76	3.62	0.82	103	3.71	0.73	45	3.69	0.72	67
77	2.36	0.79	103	2.18	0.61	45	2.21	0.75	67
78	2.52	0.99	103	2.31	0.76	45	2.55	0.93	67
79	2.88	0.87	103	2.91	0.85	45	3.09	0.73	67
80	3.29	0.87	103	2.84	0.64	45	2.76	0.70	67
81	3.42	1.12	103	3.49	1.12	45	3.81	1.12	67
82	2.59	0.88	103	2.64	0.80	45	2.82	0.72	67
83	3.63	0.85	103	3.76	0.68	45	3.79	0.57	67
84	3.18	0.97	103	3.18	0.96	45	3.30	0.89	67
85	4.02	0.61	103	3.91	0.56	45	3.78	0.55	67
86	4.21	0.52	103	4.02	0.66	45	4.02	0.48	67
87	2.55	0.74	103	2.78	0.77	45	3.06	0.80	67
88	2.48	0.88	103	2.47	0.82	45	2.72	0.88	67

TEACHER BELIEFS BY GEOGRAPHIC REGION

Table 31. Means for Responses, Questions 64 through 88

	URBAN			SUBURBAN			RURAL		
Question	Mean	SD	n	Mean	SD	n	Mean	SD	n
64	4.50	0.76	8	4.43	0.80	150	4.09	0.87	57
65	3.88	0.99	8	2.71	0.80	150	2.63	0.90	57
66	3.88	0.99	8	3.03	0.81	150	2.88	0.73	57
67	4.13	0.84	8	3.91	0.70	150	3.86	0.61	57
68	4.25	0.71	8	4.29	0.63	150	3.95	0.77	57
69	3.75	1.17	8	3.33	0.83	150	3.04	0.98	57
70	2.88	0.64	8	2.88	0.84	150	3.12	0.85	57
71	3.00	0.76	8	2.91	0.93	150	2.90	0.77	57
72	4.25	0.71	8	4.06	0.59	150	4.02	0.61	57
73	2.75	0.89	8	3.00	0.82	150	3.00	0.82	57
74	3.88	0.99	8	3.86	0.70	150	3.58	0.80	57
75	2.25	1.04	8	3.04	0.91	150	2.88	0.93	57
76	2.88	0.35	8	3.63	0.76	150	3.84	0.77	57
77	2.88	0.99	8	2.30	0.70	150	2.12	0.78	57
78	2.50	1.31	8	2.39	0.90	150	2.72	0.92	57
79	2.75	1.04	8	2.87	0.83	150	3.21	0.75	57
80	3.75	1.17	8	3.07	0.74	150	2.83	0.87	57
81	3.75	0.71	8	3.38	1.11	150	3.98	0.92	57
82	3.25	1.04	8	2.57	0.79	150	2.86	0.81	57
83	3.63	0.52	8	3.71	0.76	150	3.70	0.71	57
84	2.88	0.64	8	3.19	0.97	150	3.33	0.91	57
85	4..13	0.84	8	3.99	0.54	150	3.72	0.62	57
86	4.38	0.52	8	4.10	0.58	150	4.11	0.45	57
87	2.50	0.76	8	2.76	0.78	150	2.79	0.82	57
88	3.00	0.93	8	2.44	0.85	150	2.77	0.89	57

TEACHER BELIEFS BY PILOT/NON-PILOT

Table 32. Means for Responses, Questions 64 through 88

	PILOT			NON-PILOT		
Question	Mean	SD	n	Mean	SD	n
64	4.40	0.75	124	4.25	0.91	91
65	2.83	0.93	124	2.60	0.74	91
66	3.07	0.78	124	2.96	0.86	91
67	3.94	0.65	124	3.85	0.71	91
68	4.22	0.61	124	4.17	0.78	91
69	3.37	0.82	124	3.13	0.97	91
70	2.97	0.84	124	2.91	0.85	91
71	2.96	0.87	124	2.84	0.90	91
72	4.08	0.58	124	4.02	0.63	91
73	2.92	0.82	124	3.09	0.81	91
74	3.77	0.75	124	3.81	0.74	91
75	2.94	0.89	124	3.01	0.98	91
76	3.60	0.78	124	3.75	0.75	91
77	2.32	0.78	124	2.22	0.70	91
78	2.41	0.90	124	2.58	0.96	91
79	2.99	0.86	124	2.90	0.78	91
80	3.09	0.81	124	2.96	0.82	91
81	3.44	1.12	124	3.70	1.01	91
82	2.64	0.79	124	2.73	0.86	91
83	3.69	0.78	124	3.73	0.68	91
84	3.12	0.92	124	3.34	0.97	91
85	3.91	0.60	124	3.93	0.57	91
86	4.15	0.55	124	4.07	0.53	91
87	2.75	0.76	124	2.77	0.83	91
88	2.47	0.87	124	2.66	0.87	91

ATTITUDE TOWARD ASSESSMENT

Table 33. Total Sample: Percents for Responses, Questions 89 through 93

Question	1	2	3	4	5	n
89	9.0	17.2	30.8	37.1	5.9	221
90	10.5	17.7	49.1	18.2	4.5	220
91	8.6	11.8	33.9	41.2	4.5	221
92	8.1	16.3	34.4	36.7	4.5	221
93	12.2	20.4	43.0	21.3	3.2	221

ATTITUDE TOWARD ASSESSMENT BY GRADE

Table 34. Percents for Responses, Questions 89 through 93

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
89	4.76	11.83	30.48	46.67	6.67	105	4.35	21.74	34.78	30.43	8.70	46	18.57	22.86	28.57	27.14	2.86	70
90	5.71	13.33	50.48	22.86	7.62	105	11.11	22.22	48.89	15.56	2.22	45	17.14	21.43	47.14	12.86	1.43	70
91	4.76	8.57	31.43	45.71	9.52	105	8.70	8.70	28.26	54.35	0.00	46	14.29	18.57	41.43	25.71	0.00	70
92	7.62	9.52	37.14	37.14	8.57	105	6.52	17.39	26.09	50.00	0.00	46	10.00	25.71	35.71	27.14	1.43	70
93	7.62	10.48	44.76	30.48	6.67	105	17.39	28.26	47.83	6.52	0.00	46	15.71	30.00	37.14	17.14	0.00	70

ATTITUDE TOWARD ASSESSMENT BY GEOGRAPHIC REGION

Table 35. Percents for Responses, Questions 89 through 93

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
89	0.00	11.11	11.11	22.22	55.56	9	7.84	15.03	32.68	39.22	5.23	153	13.56	23.73	28.81	33.90	0.00	59
90	0.00	0.00	33.33	22.22	44.44	9	8.55	17.11	53.29	17.11	3.95	152	16.95	22.03	40.68	20.34	0.00	59
91	0.00	0.00	22.22	44.44	33.33	9	8.50	10.46	32.03	45.10	3.92	153	10.17	16.95	40.68	30.51	1.69	59
92	0.00	11.11	0.00	55.56	33.33	9	7.84	14.38	33.33	41.18	3.27	153	10.17	22.03	42.37	22.03	3.39	59
93	22.22	11.11	11.11	22.22	33.33	9	10.46	19.61	45.75	22.22	1.96	153	15.25	23.73	40.68	18.64	1.69	59

ATTITUDE TOWARD ASSESSMENT BY PILOT/NON-PILOT

Table 36. Percents for Responses, Questions 89 through 93

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
89	7.78	15.75	29.92	37.80	8.66	127	10.64	19.15	31.91	36.17	2.13	94
90	7.14	19.05	47.62	19.05	7.14	126	14.89	15.96	51.06	17.02	1.06	94
91	7.87	10.24	35.43	41.73	4.72	127	9.57	13.83	31.91	40.43	4.26	94
92	6.30	16.54	33.86	37.01	6.30	127	10.64	15.96	35.11	36.17	2.13	94
93	11.02	21.26	42.52	20.47	4.72	127	13.83	19.15	43.62	22.34	1.06	94

Part 2:

PROFESSIONAL DEVELOPMENT

Table 37. Total Sample: Percents for Responses, Questions 94 through 96

Question	1	2	n
94	49.3	50.7	221
95	74.5	25.5	220
96	70.5	29.5	220

PROFESSIONAL DEVELOPMENT BY GRADE

Table 38. Percents for Responses, Questions 94 through 96

	GRADE 4			GRADE 8			GRADE 10		
Question	1	2	n	1	2	n	1	2	n
94	70.48	29.52	105	34.78	65.22	46	27.14	72.86	70
95	74.29	25.71	105	68.89	31.11	45	78.57	21.43	70
96	74.29	25.71	105	67.39	32.61	46	66.67	33.33	69

PROFESSIONAL DEVELOPMENT BY GEOGRAPHIC REGION

Table 39. Percents for Responses, Questions 94 through 96

	URBAN			SUBURBAN			RURAL		
Question	1	2	n	1	2	n	1	2	n
94	77.78	22.22	9	49.67	50.33	153	44.07	55.93	59
95	100.0	0.00	9	73.03	26.97	152	74.58	25.42	59
96	44.44	55.56	9	70.59	29.41	153	74.14	25.86	58

PROFESSIONAL DEVELOPMENT BY PILOT/NON-PILOT

Table 40. Percents for Responses, Questions 94 through 96

	PILOT			NON-PILOT		
Question	1	2	n	1	2	n
94	48.82	51.18	127	50.00	50.00	94
95	75.59	24.41	127	73.12	26.88	93
96	65.87	34.13	126	76.60	23.40	94

TEACHER BELIEFS

Table 41. Total Sample: Means for Responses, Questions 97 through 110

Question	Mean	SD	n
97	3.05	1.10	221
98	3.01	1.12	221
99	3.11	0.67	220
100	4.52	0.60	221
101	4.23	0.78	221
102	4.10	0.88	221
103	3.85	1.00	221
104	2.00	0.88	221
105	1.90	0.75	221
106	1.83	0.95	220
107	3.35	1.09	221
108	3.67	0.94	221
109	4.02	0.82	221
110	2.26	1.15	221

TEACHER BELIEFS BY GRADE

Table 42. Means for Responses, Questions 97 through 110

	GRADE 4			GRADE 8			GRADE 10		
Question	Mean	SD	n	Mean	SD	n	Mean	SD	n
97	2.63	0.97	104	3.49	1.01	45	3.14	1.11	70
98	2.93	1.17	104	2.98	1.12	45	3.19	1.03	70
99	3.19	0.67	104	3.13	0.73	45	2.97	0.64	70
100	4.40	0.60	104	4.64	0.68	45	4.64	0.52	70
101	4.23	0.83	104	4.20	0.89	45	4.26	0.63	70
102	4.12	0.84	104	4.20	0.84	45	4.01	0.96	70
103	3.79	1.00	104	3.71	1.10	45	4.04	0.91	70
104	1.99	0.93	104	1.87	0.69	45	2.10	0.92	70
105	1.74	0.70	104	1.96	0.71	45	2.09	0.79	70
106	1.78	0.98	104	1.82	0.94	45	1.91	0.94	70
107	3.04	1.10	104	3.58	0.94	45	3.69	1.06	70
108	3.66	0.90	104	3.56	1.10	45	3.74	0.91	70
109	4.10	0.70	104	4.00	0.95	45	3.90	0.89	70
110	2.29	1.21	104	1.84	1.00	45	2.47	1.07	70

TEACHER BELIEFS BY GEOGRAPHIC REGION

Table 43. Means for Responses, Questions 97 through 110

	URBAN			SUBURBAN			RURAL		
Question	Mean	SD	n	Mean	SD	n	Mean	SD	n
97	2.33	1.00	9	3.01	1.11	152	3.29	1.04	58
98	2.89	0.93	9	2.86	1.11	152	3.48	1.05	58
99	3.22	0.67	9	3.11	0.69	152	3.10	0.64	58
100	4.44	0.73	9	4.57	0.58	152	4.40	0.62	58
101	4.22	0.67	9	4.31	0.77	152	4.04	0.82	58
102	4.22	0.83	9	4.06	0.94	152	4.19	0.76	58
103	3.44	1.13	9	3.90	0.97	152	3.81	1.05	58
104	2.78	1.09	9	1.99	0.83	152	1.90	0.93	58
105	1.67	0.71	9	1.86	0.72	152	2.04	0.79	58
106	2.22	1.30	9	1.83	0.96	152	1.78	0.88	58
107	3.33	1.12	9	3.24	1.12	152	3.66	0.98	58
108	3.56	1.24	9	3.68	0.96	152	3.64	0.87	58
109	4.00	1.12	9	3.99	0.83	152	4.07	0.77	58
110	2.44	1.13	9	2.34	1.15	152	2.02	1.12	58

TEACHER BELIEFS BY PILOT/NON-PILOT

Table 44. Means for Responses, Questions 97 through 110

	PILOT			NON-PILOT		
Question	Mean	SD	n	Mean	SD	n
97	3.09	1.10	126	3.01	1.11	93
98	2.95	1.10	126	3.12	1.13	93
99	3.10	0.67	126	3.12	0.69	93
100	4.52	0.58	126	4.53	0.64	93
101	4.17	0.84	126	4.32	0.69	93
102	4.06	0.83	126	4.15	0.97	93
103	3.75	1.01	126	3.99	0.97	93
104	1.98	0.90	126	2.02	0.86	93
105	1.83	0.69	126	1.99	0.80	93
106	1.83	0.90	126	1.83	1.03	93
107	3.33	1.10	126	3.39	1.08	93
108	3.64	0.95	126	3.70	0.94	93
109	4.01	0.85	126	4.02	0.78	93
110	2.20	1.10	126	2.33	1.20	93

USE OF INSTRUCTIONAL TECHNOLOGY

Table 45. Total Sample: Percent for Responses, Questions 111 through 114

Question	1	2	3	4	5	n
111	3.2	5.9	59.3	13.6	18.1	221
112	57.1	13.2	16.0	5.0	8.7	219
113	4.1	5.9	44.7	23.7	21.5	219
114	39.1	35.9	4.1	8.2	12.7	220

USE OF INSTRUCTIONAL TECHNOLOGY BY GRADE

Table 46. Percent for Responses, Questions 111 through 114

	GRADE 4						GRADE 8						GRADE 10					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
111	5.71	9.52	26.67	25.71	32.38	105	2.17	0.00	82.61	4.35	10.87	46	0.00	4.29	92.86	1.43	1.43	70
112	95.24	0.95	0.95	1.90	0.95	105	40.91	22.73	20.45	4.55	11.36	44	10.00	25.71	35.71	10.00	18.57	70
113	0.95	0.95	62.86	21.90	13.33	105	2.27	4.55	29.55	31.82	31.82	44	10.00	14.29	27.14	21.43	27.14	70
114	44.76	31.43	6.67	8.57	8.57	105	33.33	31.11	2.22	11.11	22.22	45	34.29	45.71	1.43	5.71	12.86	70

USE OF INSTRUCTIONAL TECHNOLOGY BY GEOGRAPHIC REGION

Table 47. Percents for Responses, Questions 111 through 114

	URBAN						SUBURBAN						RURAL					
Question	1	2	3	4	5	n	1	2	3	4	5	n	1	2	3	4	5	n
111	22.22	0.00	55.56	11.11	11.11	9	1.96	4.58	60.13	13.73	19.61	153	3.39	10.17	57.63	13.56	15.25	59
112	55.56	22.22	0.00	22.22	0.00	9	52.98	11.26	21.19	5.30	9.27	151	67.80	16.95	5.08	1.69	8.47	59
113	0.00	0.00	66.67	11.11	22.22	9	3.31	5.96	43.71	23.84	23.18	151	6.78	6.78	44.07	25.42	16.95	59
114	33.33	33.33	22.22	0.00	11.11	9	34.87	35.53	3.95	9.87	15.79	152	50.85	37.29	1.69	5.08	5.08	59

USE OF INSTRUCTIONAL TECHNOLOGY BY PILOT/NON-PILOT

Table 48. Percents for Responses, Questions 111 through 114

	PILOT						NON-PILOT					
Question	1	2	3	4	5	n	1	2	3	4	5	n
111	3.15	5.51	62.20	11.81	17.32	127	3.19	6.38	55.32	15.96	19.15	94
112	49.60	17.60	20.80	4.00	8.00	125	67.02	7.45	9.57	6.38	9.57	94
113	3.20	7.20	44.00	19.20	26.40	125	5.32	4.26	45.74	29.79	14.89	94
114	38.89	32.54	3.97	7.94	16.67	126	39.36	40.43	4.26	8.51	7.45	94

FEEDBACK ON THE ASSESSMENT

Table 49. Total Sample: Means for Responses, Questions 115 through 119

Question	Mean	SD	n
115	3.34	0.86	204
116	3.36	0.82	204
117	3.15	0.98	203
118	2.38	1.11	204
119	2.94	1.01	201

FEEDBACK ON THE ASSESSMENT BY GRADE

Table 50. Means for Responses, Questions 115 through 119

	GRADE 4			GRADE 8			GRADE 10		
Question	Mean	SD	n	Mean	SD	n	Mean	SD	n
115	3.31	0.90	100	3.45	0.83	42	3.27	0.85	59
116	3.40	0.87	100	3.55	0.67	42	3.14	0.82	59
117	3.24	1.01	100	3.05	1.08	42	3.03	0.87	59
118	2.50	1.08	100	2.19	1.13	42	2.29	1.08	59
119	3.05	0.96	100	3.07	1.02	42	2.66	1.06	59

FEEDBACK ON THE ASSESSMENT BY GEOGRAPHIC REGION

Table 51. Means for Responses, Questions 115 through 119

	URBAN			SUBURBAN			RURAL		
Question	Mean	SD	n	Mean	SD	n	Mean	SD	n
115	2.88	1.25	8	3.39	0.86	141	3.23	0.81	52
116	3.00	1.07	8	3.44	0.74	141	3.17	0.97	52
117	2.63	1.51	8	3.22	0.96	141	3.00	0.93	52
118	2.38	1.69	8	2.35	1.08	141	2.44	1.06	52
119	2.88	1.13	8	3.05	0.97	141	2.65	1.08	52

FEEDBACK ON THE ASSESSMENT BY PILOT/NON-PILOT

Table 53. Means for Responses, Questions 115 through 119

	PILOT			NON-PILOT		
Question	Mean	SD	n	Mean	SD	n
115	3.41	0.82	113	3.23	0.92	88
116	3.36	0.78	113	3.34	0.88	88
117	3.12	1.02	113	3.16	0.95	88
118	2.40	1.12	113	2.34	1.09	88
119	2.96	1.00	113	2.92	1.04	88