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ABSTRACT

A model for use in identifying assessment needs in association with teacher-made mathematics and science tests at the secondary level was developed. The model focuses on the identification and narrowing of discrepancies between teachers' perceptions of their testing practices and actual practice. All 19 math and 16 science teachers at a 4-year high school in a mixed suburban/rural school district participated in the project. Subjects' involvement consisted of completing a brief survey instrument and supplying their most recently administered unit or quarter test. Data from 35 questionnaires and 34 tests containing more than 1,400 items were analyzed. Results cover the nature of classroom assessment, characteristics of teacher-made tests, item formats, cognitive levels treated, quality of items, and teachers' confidence in testing skills. Topics identified as important for inclusion in in-service activities for teacher test construction are the use of tables of specifications, development of higher order items, item formatting, and the empirical analysis of test results. Instruments developed during the study--the Test Analysis Guide and Teacher Testing Questionnaire--are provided. Three data tables and two bar graphs are included. (TJH)

Assessing Teacher-Made Tests in Secondary Math and Science Classrooms

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Introduction

The measurement of achievement is a critically important part of efforts to improve student learning. Instructional and evaluative decisions are based on the type of formal and informal feedback gleaned from the tests used to measure achievement. It is imperative that these tests be as technically sound as possible.

Measurement experts have made great strides in providing the technical background necessary to accurately and reliably measure achievement. This knowledge, however, is <u>not</u> effectively communicated to the classroom teacher. Courses in tests and measurement are not typically required for teacher certification; in-service training or technical support for classroom assessment are equally rare. When questioned about the tests they develop, teachers consistently indicate lack of confidence about their effectiveness and validity (Stiggins and Bridgeford, 1985).

Research indicates that teacher-made tests dominate the assessments used by teachers, regardless of test purpose, grade level, or subject area (Stiggins and Bridgeford, 1985). Reliance on them increases with grade level, with greater dependence shown by science and math teachers than teachers in other subject areas. Unfortunately, the conclusions of research on the characteristics of teacher-made tests have been disappointing.

Fleming and Chambers' (1983) examination of teacher-made tests found fewer than 20% of all items written above the knowledge level of Bloom's Taxonomy (see Bloom, Madaus, and Hastings, 1981). The majority of items were written in a short answer format. Matching, multiple choice, and true-false formats were used far less frequently, and essay items were virtually nonexistent. Other troublesome characteristics such as ambiguous items, grammatical errors, and lack of directions were found to be quite common.

The findings of research on teachers' use of post-hoc analyses of test results has been quite disconcerting. In their survey of elementary, junior high, and high school teachers, Gullickson and Ellwein (1985) found that few, if any, systematic analyses of test results were performed by classroom teachers. Without such analyses, there is little assurance that the tests serve the purposes for which they were designed.

Valid, reliable, and objective assessment of student achievement is imperative. Teacher-made tests are the primary tools used in this process, but research implies that they are seriously flawed. The purpose of this study was to develop and apply a model that can be used in identifying assessment needs at the school or district level and offer suggestions as to how those needs can be addressed through in-service activit'es. The model focuses on the identification and narrowing of discrepancies between teachers' perceptions of their testing practices and actual practice.

Methodology

All 19 math and 16 science teachers at the four senior high schools (9th - 12th grades) in a mixed suburban/rural district participated in the project. Their involvement consisted of completing a brief survey instrument and supplying their most recently administered unit or quarter test. Although some teachers supplied multiple tests, only one per teacher was chosen at random for analysis. One teacher who completed the questionnaire failed to supply a test copy. Thus, 35 questionnaires and 34 tests containing more than 1400 items were included.

A rating form (see Appendix A) was developed to analyze the sample of teacher-composed tests. Tests were rated on four criteria: item format, cognitive levels addressed, item quality, and presentation. While research relating performance on teacher-made tests to other student outcomes is virtually non-existent, these criteria were chosen for their relationship to the content validity and reliability of teacher-made tests.

The proportion of items written in each format (e.g., multiple choice, true-false, matching, short answer, or essay) was calculated primarily to ascertain the accuracy of teachers' perceptions of their testing practices. While the classification of multiple choice, true-false, or matching items is straightforward, short answer and essay items are differentiated less easily. Items were classified as short answer if they required the student to respond in a single sentence or less. Essay items required organized, extended responses. The proportion of items written at each cognitive level, rated according to a modified version of Bloom's taxonomy, was calculated because of its relationship to content validity; that is, a valid test must adequately sample both the objectives taught and the levels of knowledge expected for each objective. Item quality and test presentation were assessed for their inextricable tie to test reliability. Item quality was estimated by reviewing the items written in each format according to commonly accepted recommendations (see, for example, Sax, 1989 or Carey, 1988). Sets of similar item formats were then rated on the basis of flaws of anv type in more than or less than 20% of the items. Presentation was rated on characteristics such as the adequacy of instructions, formatting, numbering system, and duplication quality. These characteristics were measured according to modified Likert scales.

Where appropriate, inter-rater reliability was measured as the percentage of agreement among raters. Training was provided to raters, and, based on a sample of several tests, reliability coefficients ranged from 90 to 100 percent.

The _Teacher Testing Questionnaire_ (see Appendix B) was used to measure teachers' perceptions of their testing skills. Items on the questionnaire examined the purposes for which the tests were used, teachers' perceptions of their test items (i.e., levels of knowledge tested, use of item formats, etc.) and their general testing practices, the analyses performed on test results, and the confidence teachers' had in their test development skills.

Results

Nature of Classroom Assessment

There is conclusive evidence that teachers perceive summative evaluation as the dominant purpose of classroom testing and that teacher-made tests are the most important source of information upon which this evaluation is based. Teachers indicated that more than 70% of all tests were administered for the primary purpose of assigning grades. They also reported using test results in formative manners, often to identify student weaknesses and modify instruction, but such use is secondary to the purpose of assigning grades.

While formative and summative use of test results is commendable, the tremendous weight placed on teacher-made tests in student evaluation underscores the need to ensure that these tests are valid and reliable indicators of student performance. In fact, when asked to rank in importance the sources from which they obtained the information needed to evaluate students, 31 of the 35 teachers ranked their own tests first. Classroom participation and feedback obtained from instruction were ranked next in importance. Interestingly, standardized tests were ranked below classroom behavior by 28 teachers!

Characteristics of Teacher-Made Tests

General Characteristics. More than 1,400 items from 35 tests were examined. Teachers reported writing about 65% of these items. The remaining items were obtained from test guides, textbooks, workbooks, and other sources. The number of items per test varied widely from a minimum of 14 to a maximum of 103 items. On average, there were 42 items per test. With few exceptions, all tests were judged to be of reasonable length.

Twenty-four of the tests (70%) were completely type-written, two (6%) contained typed and hand-written sections, and 8 (24%) were totally hand-written. In only four cases was duplication quality judged to be inadequate. Formatting was a problem in more than 70% of the tests. Common examples of this deficiency were crowding, inconsistent style and margins, and lack of space for answers.

Written instructions were provided on 25 of the 34 tests (74%). All but two of these contained instructions for the total test as well as subsections.

Nine tests (26%) contained no instructions, despite the fact that teachers reported on the questionnaire nearly always including written instructions for each subsection.

Instructions were deemed "nebulous" for 21 of the 25 tests (84%) that included written instructions. "Nebulous" referred to instructions such as those that ask students to choose an answer without indicating how or where the choice should be recorded. This was particularly problematic for matching items where two long lists were often presented with no space provided for answers. The student was left to decide whether to match Column A to Column B, Column B to Column A, or draw lines between the two.

Students were not typically informed of the point value of any test or item. None of the 34 tests contained a written explanation of the weight of that test in determining a student's grade. The point value of individual items or sections was specified in only six tests (18%). Ironically, teachers reported frequently informing students of item values. Unless this information was verbalized to the students prior to testing, there is little evidence to support such a contention.

Item Formats. The results of the analyses pertaining to item formats are reported in Figure 1. According to the results observed by the researchers, more than 60% of all items were written in a short answer format. Multiple choice, matching, and true-false formats accounted for about 20%, 15%, and 5% of all items respectively. The most striking observation was the inclusion of only 4 essay items among the more than 1400 items examined.

As shown in Figure 1, similarities were found between the percentages observed by the researchers and those perceived by the teachers for multiple choice, true-false, and matching formats. Teachers, however, perceived themselves writing far fewer short answer items and many more essay items than were observed.

Insert Figure 1 about here

Teachers did not routinely weight item formats differently. As revealed in Table 1, the self-reported percentage of a student's score determined by any one item format paralleled the percentage of items written in that format.

Insert Table 1 about here

Cognitive Levels Tested. Teachers agree that the vast majority of items were written at the lower cognitive levels of knowledge and comprehension (Bloom, Madaus, & Hastings, 1981). A major discrepancy lies, however, in the perceived percentage of items written at higher levels. Although teachers reported that roughly one-fourth of all items were written at the application, analysis, synthesis, or evaluation level, the researchers' analyses placed less than 8% of all items at these cognitive levels, with virtually no items requiring students to synthesize or evaluate (see Figure 2). A *t*-test of mean differences between teacher perceptions of the percentage of items written at the levels of synthesis or evaluation and rater judgments of percentage of items at these levels was statistically significant [*t*=4.76, *p*<.001 with Bonferroni (Dunn, 1961) correction]. This discrepancy confirms Carter's (1984) finding that teachers tend to inaccurately classify higher order items.

Insert Figure 2 about here

Possible effects of school and subject taught were analyzed (see Table 2). Results indicated that the individual school had no effect on teachers' use of higher level test items. However, the subject - math or science - did significantly affect the percentage of items judged to be written at the knowledge and comprehension levels. No differences by subject were found at other cognitive levels. Although teachers of both disciplines wrote the majority of items at these two lower levels, math teachers included significantly greater numbers of comprehension items on their exams. While the science tests analyzed contained, on average, 78% of all items at the knowledge level and 17% at the comprehension level, math tests had an average of 78% of all items written at the comprehension level with about 13% at the knowledge level. This finding can be attributed to the tendency to test math skills by requiring students to solve number problems (comprehension level).

Insert Table 2 about here

The finding of major importance here is not the differences by subject at the lower levels of knowledge, but the lack of items in either subject at higher levels. Interestingly, few math teachers required students to apply knowledge of procedures to new situations. Word problems were regretfully scarce.

Quality of Items. Grammatical errors discovered by the raters were few in number, but other item writing flaws were quite common across all formats. Of the four essay items examined, all contained major flaws. None contained information to guide the student in structuring a response or tapped higher level thinking skills. Of the 18 tests containing multiple choice items, 17 were judged to have flaws in more than 20% of these items. Common errors were more than one correct answer, posing the question in the distracters rather than the stem, grammatical inconsistencies between the stem and distracters, inappropriate use of "all of the above" and "none of the above", and asking more than one question in the stem. Similar results were obtained for tests containing matching items, with perfect matching and the lack of response guidelines the most common deficiencies in this format. A slight improvement was observed for short answer and true-false items, but errors were still found in more than half of the tests containing items of these types. Of these, the most consistent were the use of vague stems, multiple blanks within an item, and the use of negative statements.

Teachers' Confidence in Testing Skills.

Teachers were asked to respond on a five point Likert scale (1 equals "strongly disagree" to 5 equals "strongly agree") as to how confident they felt about their testing skills. They reported, on average, feeling confident in their ability to construct valid and reliable tests (M=4.40) and assess the validity and reliability of those tests (M=4.29). They tended to rate their pre-service training in tests and measurement as adequate (M=3.71) and were only slightly less assured of the adequacy of their in-service training (M=3.49).

Teachers reported routinely practicing some commonly accepted test development procedures (see Table 3). They indicated that tests were almost always based on instructional objectives, that objective scoring procedures were used, and that test results were reviewed with students.

Insert Table 3 about here

It appears that teachers do not consistently use tables of specifications to construct their tests, nor do they empirically analyze item or test level data (see Table 3). Response data indicates they only occasionally tally the number of items per instructional objective or per level of knowledge, compute item statistics, eliminate items on the basis of item statistics, or compute an arithmetic mean for the test. As indicated by the. own responses, teachers appear confident in their knowledge about these empirically related practices, but they tend to disregard them when analyzing their own tests.

Discussion

Utilizing test analysis guides and self-report questionnaires are excellent means of identifying misconceptions and concerns of classroom teachers regarding their own tests. Some caveats related to these analyses are in order here. First, test ratings should not be considered as a means of teacher evaluation. Many decisions will be subjective, and the quality of one or two tests will not necessarily be indicative of all tests composed by that teacher.

Secondly, it should be recognized that test quality is usually a reflection of training, not ability. Teachers can be taught to construct valid and reliable tests, but such instruction and subsequent test development are time-consuming. Even with proper training, teachers may not find the time to perform the recommended test analyses. They must, therefore, be presented time-saving tips that are easily understood and implemented.

The most difficult area to address will be development of items testing higher order thinking skills. Developing and classifying such items require practice. An item that appears to be a higher order item may, because of the instruction provided, actually be written at the level of knowledge or comprehension. Thus, raters must recognize that classification of items is occasionally subjective. Illustrative examples of Bloom's Taxonomy such as those offered in Bloom, Madaus, and Hastings (1981) or Gronlund (1990) and alternative taxonomies like that offered by Quellmalz (1985) are helpful in reducing such subjectivity. Finally, teachers should be advised to avoid classifying items based on format; all essay items are not higher order items!

Recommendations

The Test Analysis Guide and Teacher Testing Questionnaire (Appendices A and B) are useful in providing in-service activities that are tailored to the needs of the school or district. Our results suggested four topics for inclusion in such activities.

First, the preponderance of knowledge and comprehension level items and the failure of teachers to map test items to targeted objectives suggest a need to provide instruction in the use of tables of specifications. Opportunity for practice in constructing the table and mapping items can greatly improve the content validity of teacher-made tests.

A related weakness was noted in the lack of items addressing higher order skills. Writing items at the levels of analysis, synthesis and evaluation requires practice. In-service workshops can provide the mechanism through which teachers of the same discipline could help one another in developing higher order items. Measurement textbooks such as Gronlund's (1990) provide descriptions of the major categories of the cognitive domain, illustrative objectives and suggested verbs to use in stating student outcomes. An excellent source for tips in writing higher order items is Sax's (1989) text. With practice, teachers can write items that cover a breadth of content and learning outcomes.

A third in-service activity should address weaknesses in specific item formats. Again, a basic measurement text will provide guidelines. As an example, multiple choice items should present the problem or question in the stem. The correct answer should not be discernible from its length in relation to the distracters or from language association with the stem. Guided practice, perhaps using some of their own items, will help teachers recognize and correct such common errors that compromise item reliability.

Finally, the empirical analysis of test results should be discussed, but it is most important here to recognize that this is the phase that the already overburdened classroom teacher is least likely to incorporate into routine testing practices. Although computerized analyses are possible, analysis of any detail requires entering individual student responses into the computer either directly or through optical scan readers. This process can be simplified with software designed for use by classroom teachers (Oescher and DeGolyer, 1989). Of course, objective tests are required. Although computerized analysis is to be encouraged where possible, simple techniques to estimate item and test reliability can be mastered quickly. Again, suggestions are offered by Gronlund, (1990), Sax (1989), and Carey (1988) that will greatly reduce the time involved in item and test analyses.

In concluding, it should be emphasized that the primary purpose of analyzing teacher testing practices is to inform the process of training for improvement. When the stakes for students are admittedly high, the tools of evaluation must be above reproach.

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Table 1

Teachers' Self-reported Use of Item Formats

	Multiple Choice	True-False	Matching	Short Answer	Essay
Average percentage of items written in each format	15.46	8.31	15.46	40.23	20.69
Average percentage of score obtained from each format	13.68	8.12	14.12	41.76	22.32

Table 2

ANOVA Summary Tables for the Effect of Subject Taught on the Percentage of Items Observed at Knowledge and Comprehension Levels

Dependent Variable: Knowledge

	df	*SS*	*F*
Subject	1	3.49	94.04*
Error	32	1.39	
Total	33	4.88	

*p < .0001

Dependent Variable: Comprehension

	df	*SS*	*F*
Subject	1	2.84	74.63*
Error	32	1.57	
Total	33	4.41	

*p < .0001

Note. The mean percentage of items written at the knowledge level was 78.2 for science (N=15) and 12.5 for math (N=19). The mean percentage at the comprehension level was 16.8 for science and 77.5 for math.

Table 3

Reported Testing Practices of 35 Math and Science Teachers

Item	M	SD
My tests are based on my instructional objectives	4.85	.36
I tally the number of items intended to measure each instructional objective	3.31	1.18
I tally the number of items intended to measure each level of student performance	2.97	1.15
I include written instructions for each section of my tests	4.60	.91
My students are informed of the point value of each test item	4.06	1.00
I complete an answer key for each objective item before scoring tests	4.80	.63
I write out an appropriate or desired response for each essay item before scoring these items	4.38	1.15
Scores on my tests are adjusted for guessing	1.76	1.23
I assign the point values for individual items before correcting all tests	3.21	1.01
I compute item analysis information for my tests	2.36	.90

Table 3 (continued)

I eliminate certain items in determining test scores	2.42	.61
I compute an arithmetic mean of scores received by students for each test	2.63	1.21

Note. Entries represent scores on the following modified five-point Likert Scale: 1 = Never, 2 = Seldom, 3 = Sometimes, 4 = Frequently, and 5 = Always.

Appendix A

TEST ANALYSIS GUIDE

ITEM INFORMATION	Type	#	%
ITEM FORMAT	1=MULTIPLE CHOICE		
	2=TRUE/FALSE		
	3=MATCHING		
	4=SHORT ANSWER		
	5=ESSAY		
	6=CHOICE OF ESSAYS		
	Totals		
KNOWLEDGE LEVEL TARGETED	1=KNOWLEDGE		
	2=COMPREHENSION		
	3=APPLICATION		
	4=ANALYSIS		
	5=SYNTHESIS		
	6=EVALUATION		
	Totals		
AUTHOR	1=DEFINITELY FROM TEXT OR WORKBOOK		
	2=PROBABLY FROM TEXT OR WORKBOOK		
	3=PROBABLY TEACHER-COMPOSED		
	Totals		

GENERAL TEST INFORMATION	SCORING KEY
GRAMMATICAL ERRORS	1=MANY
	2=FEW
	3=NONE
NUMBERING SYSTEM	1=NOT LOGICAL
	2=LOGICAL
VALUE OF OVERALL TEST INDICATED	1=NO
	2=YES
VALUE OF INDIVIDUAL ITEMS INDICATED	1=NO
	2=YES
TEXT PRESENTATION	1=HAND-WRITTEN
	2=TYPEWRITTEN

Appendix A (continued)

INCLUSION OF INSTRUCTIONS	1=NO INSTRUCTIONS 2=INSTRUCTIONS FOR OVERALL TEST ONLY 3=INSTRUCTIONS FOR CVERALL TEST AND SUBSECTIONS
QUALITY OF INSTRUCTIONS	1=NOT APPLICABLE (NO INSTRUCTIONS) 2=NEBULOUS 3=EXPLICIT
QUALITY OF DUPLICATION	1=UNREADABLE 2=READABLE WITH DIFFICULTY 3=READABLE
QUALITY OF PRESENTATION	1=UNFORMATTED 2=PARTIALLY FORMATTED 3=FORMATTED
QUALITY OF MULTIPLE CHOICE ITEMS	1=NOT APPLICABLE (NO ITEMS OF THIS TYPE) 2=ERRORS IN MORE THAN 20% OF ITEMS 3=ERRORS IN LESS THAN 20% OF ITEMS 4=NO ERRORS
QUALITY OF TRUE/FALSE ITEMS	1=NOT APPLICABLE (NO ITEMS OF THIS TYPE) 2=ERRORS IN MORE THAN 20% OF ITEMS 3=ERRORS IN LESS THAN 20% OF ITEMS 4=NO ERRORS
QUALITY OF MATCHING ITEMS	1=NOT APPLICABLE (NO ITEMS OF THIS TYPE) 2=ERRORS IN MORE THAN 20% OF ITEMS 3=ERRORS IN LESS THAN 20% OF ITEMS 4=NO ERRORS
QUALITY OF SHORT ANSWER ITEMS	1=NOT APPLICABLE (NO ITEMS OF THIS TYPE) 2=ERRORS IN MORE THAN 20% OF ITEMS 3=ERRORS IN LESS THAN 20% OF ITEMS 4=NO ERRORS
QUALITY OF ESSAYS	1=NOT APPLICABLE (NO ITEMS OF THIS TYPE) 2=ERRORS IN MORE THAN 20% OF ITEMS 3=ERRORS IN LESS THAN 20% OF ITEMS 4=NO ERRORS

Appendix B

TEACHER TESTING QUESTIONNAIRE

Please respond completely and truthfully to the following items.
Your responses will be confidential.

Name ________________________ School ________________

Grade level(s) you teach __________ Subject(s) you teach ______________

A. Rank order the following according to the relative emphasis you place on each in evaluating student achievement in your classes. Assign "1" to the most heavily weighted measure, "2" to the 2nd most important, etc.

____ Standardized tests

____ Teacher-made tests

____ Feedback obtained during instruction

____ Classroom participation and effort

____ Individual behavior (conduct)

Appendix B (continued)

Although you may use varying kinds of tests in your classes, respond to the following items considering the <u>general</u> characteristics of all of the tests thet <u>you</u> choose for classroom use. Do not consider tests administered by the school system.

a. Assign percentages to each category in the following items. Be sure that each row sums across to 100%.

Items 1-3 refer to the actual test items you use.

1.

% written by you	% obtained from texts, workbooks, etc.	% obtained from other sources (explain)	Total
			100%

2.

% requiring student to recall facts terms, rules, or principles	% requiring student to demonstrate understanding by using procedures	% requiring student to apply rules or principles to new or unfamiliar situations	% requiring student to synthesize prior learning in order to analyze and evaluate new material	Total
				100%

3.

% Multiple choice items	% True/False items	% Matching items	%Short answer/ fill-in items	% Essay items	Total
					100%

Appendix B (continued)

Items 4-5 refer to your analysis and use of test results

4. ____

% of score obtained from multiple choice items	% of score obtained from true/false items	% of score obtained from matching items	% of score obtained from short answer items	% of score obtained from essay items	Total
					100%

5. ____

% of tests used mainly for diagnostic purposes	% of tests used mainly for placement of students	% of tests used mainly for assigning student grades	% of tests used mainly to evaluate instruction	% of tests used mainly to reinforce instruction	Total
					100%

C. **On a scale of 1 to 5 where 1 = never and 5 = always, indicate your response to each of the following items by circling the corresponding number.**

6. My tests are based on my instructional objectives.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

7. When composing a test, I tally the number of items intended to measure each instructional objective.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

8. When composing a test, I tally the number of items intended to measure each level of student performance (eg. recall, understanding, etc.)

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

Appendix B (continued)

9. My tests are hand-written.

1	2	3	4	5
Never	Seldom	Sometimes	Frequentlv	Always

10. I include written instructions for each of the sections of my tests.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

11. My students are informed of the point value of each item on my tests.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

12. I complete an answer key for objective items before scoring my tests.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

13. I write out an appropriate or desired response for each essay item before scoring these items on my tests.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

14. Scores on my tests are adjusted for guessing.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

15. I assign the point values of individual test items after correcting all tests.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

16. I assign test grades based on how well students perform relative to others in the group (norm-referenced perspective).

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

Appendix B (continued)

17. I assign test grades based on mastery of content regardless of performance of others in the group (criterion-referenced perspective).

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

18. I compute item analysis information for my tests.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

19. I eliminate certain items in determining test scores.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

20. I compute an arithmetic mean of the scores received by students for each test.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

21. I review tests with students after administering and scoring them.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

22. I use test results to identify student weaknesses.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

23. I revise my instructional plans based on test results.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

24. I assign remedial or supplemental work to individual students based on test results.

1	2	3	4	5
Never	Seldom	Sometimes	Frequently	Always

Appendix B (continued)

D. On a scale of 1 to 5 where 1 = strongly disagree and 5 = strongly agree, indicate your response to each of the following items by circling the corresponding number.

25. I feel confident in my ability to construct valid and reliable tests.

1	2	3	4	5
Strongly disagree	Disagree	Not sure	Agree	Strongly agree

26. I feel confident in my ability to assess the reliability and validity of my tests.

1	2	3	4	5
Strongly disagree	Disagree	Not sure	Agree	Strongly agree

27. I received adequate pre-service training in testing and student evaluation.

1	2	3	4	5
Strongly disagree	Disagree	Not sure	Agree	Strongly agree

28. I received adequate in-service training in testing and evaluation.

1	2	3	4	5
Strongly disagree	Disagree	Not sure	Agree	Strongly agree

THANK YOU FOR YOUR PARTICIPATION!!!!

Figure 1: A comparison of reported and observed percentages of items written in each format.

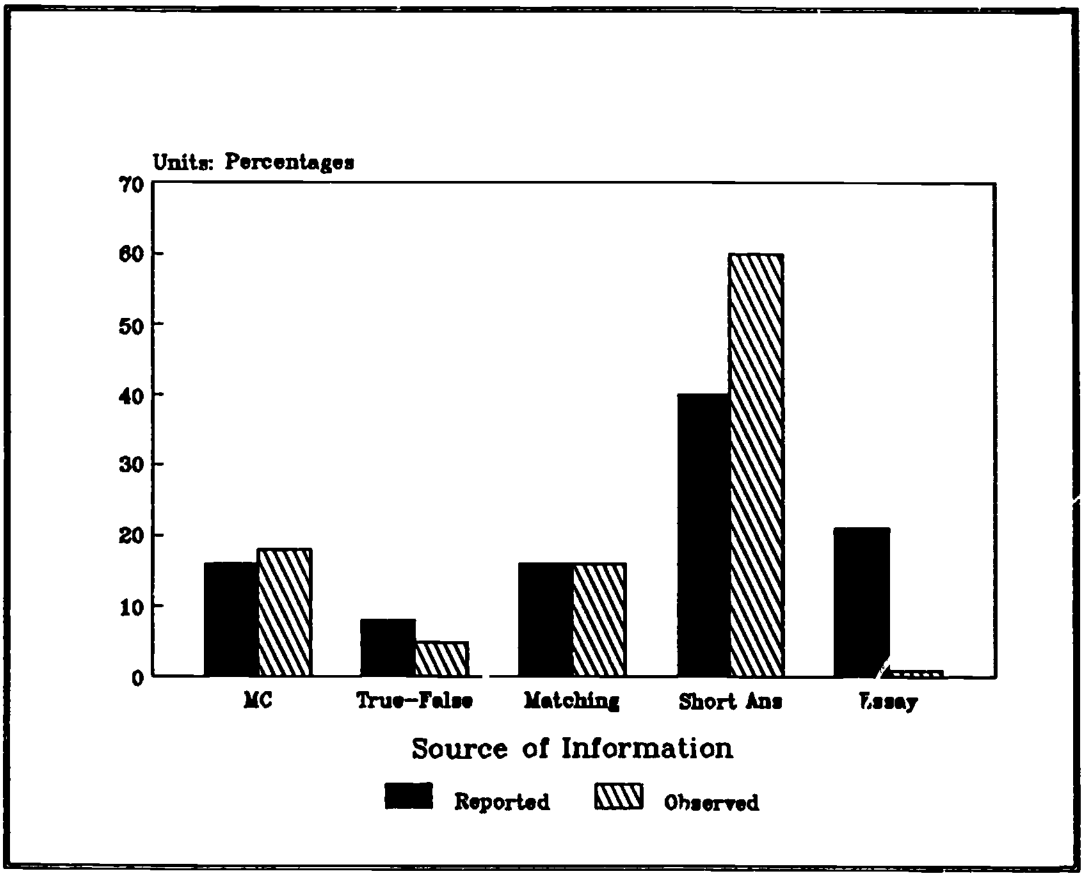
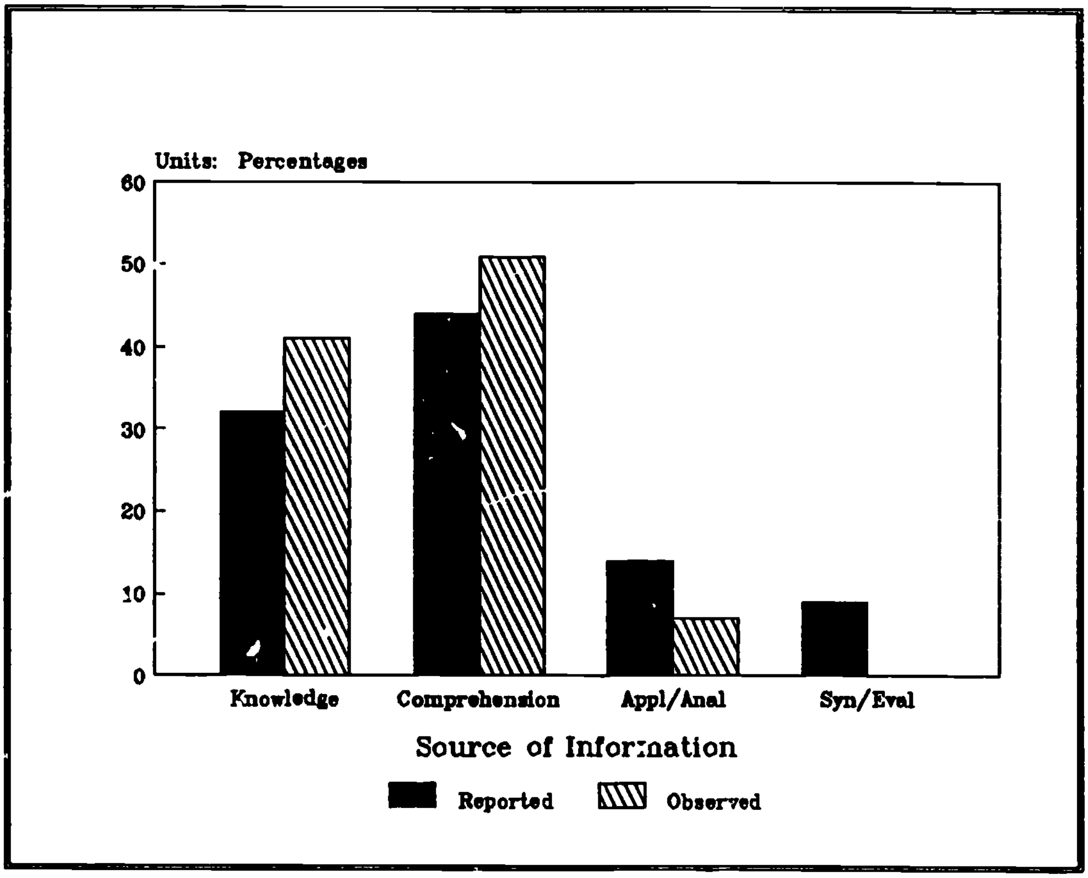


Figure 2: A comparison of reported and observed percentages of items addressing each level of knowledge.


Units: Percentages
Knowledge
Comprehension
Appl/Anal
Syn/Eval
Source of Infor:nation
Reported
Observed