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ABSTRACT

On the basis of previous research with the 38-item Pupil Observation Survey (POSR), used for evaluation of student teachers by their pupils, two central items for each of the five POSR factors were selected and reworded slightly for a new instrument. Named the Student Evaluation of Teaching (SET), the instrument was simulated for old POSR item data and the factor structure was reconfirmed. A FORTRAN routine for scoring the instrument is provided, as well as an example of output from another computer program which generates verbal summary reports from class-grouped data. A copy of the SET instrument is also included. Interpretation of SET profiles is discussed briefly. It is suggested that feedback of SET results is most effective in a context where both the student teacher and her supervisor study the profile of scores and discuss its implications. (Author/RT)

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RMM-10

STUDENT EVALUATION OF TEACHING

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Donald J. Veldman

Research Methodology Monograph No. 10
R&D Center for Teacher Education
The University of Texas at Austin

Spring, 1970

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STUDENT EVALUATION OF TEACHING

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This instrument was derived from research with a technique called the Pupil Observation Survey Report (POSR), which was the subject of an earlier monograph in this series (RMM-2). Briefly summarized, the purpose of the SET is economical measurement of the five major aspects of classroom behavior previously identified in research with student teachers. The SET contains only 10 items and utilizes an optically-scanned answer sheet, which yields data for a computer program that summarizes class responses and prints verbal reports for the teachers or their supervisors.

Summary of Research with the POSR

The POSR was an outgrowth of research by McClain and Bown (1961) with an experimental instrument developed by McClain (1961). A preliminary version of the POSR was used by Veldman and Peck (1964) to study interactions of pupil and teacher sex as they influence pupil perceptions. The only interaction observed was with a group of items called "Identification Model."

During the 1961-62 academic year, data were collected from the pupils of 554 student teachers (7th through 12th grades) at the University of Texas at Austin, using the 38-item POSR form. A factor analysis of these data identified five major dimensions of the "space" within which pupils implicitly locate their teachers. The five factors were labeled as follows.

1. Friendly and Cheerful
2. Knowledgeable and Poised
3. Lively and Interesting
4. Firm Control (Discipline)
5. Non-Directive (Democratic Procedure)

As noted in the published report of this research (Veldman and Peck, 1963), the first three of these factors bear a remarkable similarity to Ryans' (1960) three "patterns" of adult-observed teacher behavior.

Analyses reported in this initial study clearly demonstrated factorial invariance of the POSR structure across three semester subsamples and across teacher sexes. Reliability coefficients derived from the data of 50 teachers with two classes were, respectively: .92, .72, .91, .81, and .89. Comparisons of male and female teacher means indicated that females were rated significantly higher only on factors 1 and 5. Correlations between POSR factors and the scales of two self-report personality-attitude inventories were low, but were frequently statistically significant and interpretable. Teaching effectiveness as rated by supervisors was significantly related to factor 1 (Friendly and Cheerful) among females only, and to factors 2 (Knowledgeable and Poised) and 4 (Strict Control) among teachers of both sexes.

A later research report by Veldman and Peck (1969) used complex covariance analyses to determine the degree to which pupil evaluations of student teachers (N=609) were related to (1) supervisor evaluations (factors 1, 2, 3 were), (2) grade level of the class (factors 1 and 3 were), (3) subject matter area (factors 1, 3, 4, 5 were), (4) socioeconomic level of the school (factors 3 and 4 were), and (5) sex of the student teacher (only factor 1 was). The small absolute sizes of most of the effects led to the conclusion that pupil reports of teacher behavior are relatively free of bias. An exception, however, is the use of the POSR with physical education classes.

The most recent report of research employing the POSR (Veldman, in press) concerned comparisons of pupil perceptions of 55 student teachers

and of their public-school teaching supervisors. The supervisors were seen as less friendly and cheerful, less lively and interesting, and less directive than the student teachers; but they were considered to be more poised and knowledgeable and more firmly controlling. Correlational evidence suggested that supervisors influenced the evaluations of the student teachers only with regard to factors 4 and 5, which suggested that the supervisors "set" the classroom atmosphere and routine before the student teachers arrive.

Development of the SET

All research carried out with data from the POSR made use of factor scores for teachers which were derived through the use of regression weights for all 38 items. In anticipation of the possibility that the simple sums of two or three items might be as useful as the regression-weighted factor scores, the three items loading each of the five factors most strongly in the original analysis were selected and simple sums of the class means of these items were computed for each of 562 student teachers. Table 1 shows the correlations between the regression-weighted factor scores and these simple sum scores.

Table 1. Correlations of Sum Scores with Factor Scores
(N = 562 student teachers)

POSR Factor	2 items	3 items
1. Friendly and Cheerful	.91	.93
2. Knowledgeable and Poised	.87	.87
3. Lively and INteresting	.77	.79
4. Firm Control	.91	.92
5. Non-Directive	.78	.74

The use of three items rather than two affords no better estimation of the factor scores. The fact that some of these correlations are far from perfect does not necessarily indicate that they would be less valid or reliable measures. Schweiker (1967) makes a convincing case for the simpler measures, noting that they are easier to compute, are more directly interpretable, and are also less subject to distortion when the equations are applied to data not included in the original analysis. In at least one study (Veldman and Parker, 1970) regression-weighted factor scores have been shown to yield lower concurrent validity than comparable Likert-scale scores.

Table 2 contains the ten items (two per factor) which were selected as the best estimators of the POSR factors, along with their slightly re-worded counterparts in the SET form.

Table 2. POSR-SET Item Correspondence

Factor I: Friendly and Cheerful

SET-1: This teacher is always friendly toward students.
POSR-26: She is always friendly toward her students.
SET-6: This teacher is usually cheerful and optimistic.
POSR-29: She always seems cheerful and happy.

Factor II: Knowledgeable and Poised

SET-2: This teacher knows a lot about the subject.
POSR-17: She knows a great deal about her subject.
SET-7: This teacher is not confused by unexpected questions.
POSR-34: She doesn't get confused by unexpected questions.

Factor III: Lively and Interesting

SET-3: This teacher is never dull or boring.
POSR-12: Her class is never dull or boring.
SET-8: This teacher makes learning more like fun than work.
POSR-31: She makes learning seem more like fun than work.

Factor IV: Firm Control

SET-4: This teacher expects a lot from students.
POSR-3: She expects a lot from her students and usually gets it.
SET-9: This teacher doesn't let students get away with anything.
POSR-32: She doesn't let her students get away with anything.

Factor V: Non-Directive

SET-5: This teacher asks for students' opinions before making decisions.
POSR-8: Before she decides on a new project, she often asks students what they think.
SET-10: This teacher often gives students a choice in assignments.
POSR-28: She likes to give the student a choice of how to do an assignment.

On a following page is a copy of the optical-scanning answer sheet which is the new SET form. The "true-false" four-choice response format of the POSR has been retained. Much of the rewording was done to avoid the use of sex-specific pronouns in the new form.

Comparison of POSR and Simulated SET Factor Structures

To confirm the correspondence of the SET 10-item factor structure with the original POSR structure, the 10 selected POSR items were factored using the sample of 562 student teachers. Five factors were extracted and rotated by the varimax method. Table 3 shows the resulting structure.

STUDENT EVALUATION of TEACHING

D. J. VELDMAN and R. F. PECK

A. TEACHER'S LAST NAME: _____

B. SUBJECT: _____

C. SCHOOL: _____

MARK THE RIGHT BOXES FOR D, E and F BELOW	
D.	TEACHER'S SEX:
E.	MY SEX:
F.	MY GRADE LEVEL: 3 4 5 6 7 8 9 10 11 12 13 14 15 16

DO NOT USE

	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9
	0 1 2 3 4 5 6 7 8 9

INSTRUCTIONS:

1. USE A NO. 2 PENCIL ONLY.
2. PRINT THE INFORMATION FOR A, B, AND C.
3. MARK THE RIGHT BOXES FOR D, E, AND F.
4. DO NOT MAKE ANY EXTRA MARKS.
5. ERASE ERRORS COMPLETELY.

MARK ONE OF THE FOUR BOXES IN FRONT OF EACH STATEMENT

THE FOUR CHOICES MEAN:

F = VERY MUCH FALSE
f = MORE FALSE THAN TRUE
t = MORE TRUE THAN FALSE
T = VERY MUCH TRUE

THIS TEACHER:

F f t T is always friendly toward students.

F f t T knows a lot about the subject.

F f t T is never dull or boring.

F f t T expects a lot from students.

F f t T asks for students' opinions before making decisions.

F f t T is usually cheerful and optimistic.

F f t T is not confused by unexpected questions.

F f t T makes learning more like fun than work.

F f t T doesn't let students get away with anything.

F f t T often gives students a choice in assignments.

Table 3. Varimax structure of 10 selected POSR Items.

POSR Factor	SET Item	POSR Item	Factor 1	2	3	4	5
1	1	26	.89*	.18	.18	.02	.22
1	6	29	.89*	.12	.23	.08	.23
2	2	17	.19	.89*	.10	.19	.11
2	7	34	.11	.84*	.28	.19	.18
3	3	12	.39	.33	.71*	.26	.24
3	8	31	.45	.28	.70*	.12	.36
4	4	3	.21	.28	-.06	.86*	.09
4	9	32	-.16	.10	.34	.83*	.04
5	5	8	.17	.09	.12	.10	.91*
5	10	28	.27	.20	.26	.00	.81*

*expected primary loadings

It is obvious from the loadings in Table 3 that the expected primary loadings were, indeed, appropriately high. A further check was carried out using Program RELATE (Veldman, 1967) to re-rotate the varimax structure toward a hypothesis structure where every item was totally identified with one of the five factors. This technique is fully explained in another monograph of this series (RMM-8). All five correspondence coefficients for the factors exceeded .98, and no pair of item vectors had a coefficient less than .82. In summary, the SET items yield a factor structure closely approximating that of the original 38 POSR items.

Further information about these 10 item pairs is provided in Table 4, which contains their means and sigmas, as well as the intra-pair item correlations.

Table 4. Means, sigmas and intra-pair correlations of items.

Factor	Item	Mean	Sigma	Correlation
1	1	3.58	.33	.86
1	6	3.50	.37	
2	2	3.60	.24	.73
2	7	3.19	.32	
3	3	2.90	.46	.85
3	8	2.95	.47	
4	4	2.91	.32	:56
4	9	2.82	.36	
5	5	2.69	.50	.71
5	10	2.77	.40	

Despite the clearly separate identity of the five pairs of items shown in Table 3, the Likert-type sum scores are more strongly intercorrelated than would be factor scores computed with regression weights. Table 5 shows the degree of this intercorrelation among the SET two-item scale scores, as well as their means and sigmas.

Table 5. Intercorrelations among SET scale scores.*

Scale	1	2	3	4	5
1	---	.42	.67	.19	.55
2	.42	---	.59	.44	.39
3	.67	.59	---	.40	.60
4	.19	.44	.40	---	.20
5	.55	.39	.60	.20	---
Mean	7.01	6.79	5.85	5.72	5.46
Sigma	.61	.52	.89	.59	.83

* Sum of two items; max = 8.0, min = 2.0

Before going on to consider the scoring of the SET, we should note that all data presented so far were obtained by simulating the SET with item data actually obtained from POSR protocols. At present, data are not available from actual use of the SET instrument.

Scoring the SET

The FORTRAN program used to score SET protocols and to print summary reports may be found in Appendix A, along with example input. An example of the output reports is located in Appendix B.

All of the SET items are positive statements, and the responses are numerically coded for punching as follows: F = 1, f = 2, t = 3, T = 4. The punching of cards from pupil answer sheets may be accomplished with a keypunch machine, or by a Digitek optical scanner. The card format recommended is as follows:

col 1-5: teacher code number
col 6: teacher sex
col 7-8: class grade level
col 9: optional (school, subject, etc.)
col 10: pupil sex
col 21-30: SET item scores (1-4 or blank)

The next stage of the processing is accomplished by a computer program such as the one in Appendix A. The first step is the computation of means for each of the 10 items. These are computed from valid responses, which may vary in number from one to another item. Blanks or double-marks are ignored. The printed report begins with these means and their verbal interpretations. These values range from 100 to 400, since the item means are multiplied by 100 before printing.

The item means are then paired to form the five scale scores (divided by two to maintain scaling consistency), which are also verbally interpreted. Finally, the mean of all 10 item means is computed to provide an overall index of pupil evaluation of the teacher.

At present, the scoring and interpretation is carried out on an "absolute" basis; no attempt has been made to reflect normative expectations based on a population of student teachers. Eventually, such extensions of the interpretations may be added to the program.

Interpretation of SET Profiles

As is the case with most aspects of human behavior, too much of a good thing is undesirable -- especially when other good things are sacrificed. In one of the research studies described earlier, those student teachers who were rated highest in overall effectiveness by their supervisors were rated only moderately high on factors 3 (Lively and Interesting) and 4 (Firm Control) by their pupils.

An even more important point is that the scores should be considered together as a profile or pattern. For instance, very high scores on both factor 1 (Friendly and Cheerful) and factor 4 (Firm Control) suggest a teacher who is firm with pupils without being cold or punitive. However, a high factor 1 score with a low factor 4 score suggests too much concern with

"being liked", while the opposite combination suggests harshly rigid discipline.

The present scoring and interpretation program does not analyze this pattern aspect of the SET data, although research is underway to develop such automatic interpretive procedures.

Uses of the SET in Teacher Education

It seems quite obvious that a student teacher would profit from systematic knowledge of how pupils react to her as she takes on this professional role. In many cases the SET results will only confirm what she already knows, while in others it may reveal something about her impact on children of which she had not been fully aware.

Feedback of SET results is probably most effective in a context where both the student teacher and her supervisor study the profile of scores and discuss its implications in terms of their personal perceptions of the student's approach to the teaching role. Although no data are yet available to support the viewpoint, an experienced consultant may be necessary to avoid over-interpretation and unwarranted conclusions on the part of the student. With appropriate guidance the SET can certainly do no harm and may be crucially important to the maximum development of the potential of some students.

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APPENDIX A. SCORING AND REPORT-GENERATOR PROGRAM FOR THE SET.

```
C.......PROGRAM SET (CDC6600 FORTRAN)
C...LABEL PACK OF 26 CARDS PRECEDES DATA
C...INPUT CARD FORMAT CAN BE MODIFIED (STATEMENT 25) IF NECESSARY.
C......COL  1- 9 = TEACHER IDENTIFIC  TION
C......COL 11-20 = TEN ITEM SCORES (1   OR BLANK)
C...EACH CLASS PACK OF PUPIL CARDS END  WITH A BLANK.
C...EXTRA BLANK FOLLOWS THE LAST CLASS PACK.
C...SET KP = 1 IN PROGRAM TO GET PUNCHED SCORES.
C...SET KR = 1 IN PROGRAM TO GET PRINTED PAGE REPORTS.
C...OUTPUT CARD FORMAT.
C......COL  1- 9 = TEACHER IDENTIFICATION
C......COL 10-12 = NUMBER OF PUPILS IN CLA S
C......COL 21-50 = 10 ITEM MEANS (*100)
C......COL 56-70 = 5 SCALE MEANS (*100)
C......COL 76-80 = MEAN OF ALL ITEM MEANS  *100)

      DIMENSION A(10), B(5), D(10), V(10), LA(8,5), LB(8,10), LC(4,2,5),
     1 LD(8,6), LE(3)
      DATA LE / 9H   RATHER, 9H    QUITE, 9H     VERY/
      KP = 0
      KR = 1
      READ 5, LA, LB, LC, LD
    5 FORMAT (8A10)
   10 N = 0
      DO 15 I = 1,10
   15 A(I) = V(I) = 0
   20 READ 25, ID, D
   25 FORMAT (A9, 11X, 10F1)
      IF (ID .NE. 1H ) GO TO 30
      IF (N .EQ. 0) STOP
      GO TO 40
   30 N = N + 1
      IDX = ID
      DO 35 I = 1,10
      IF (D(I) .GT. 0) V(I) = V(I) + 1
   35 A(I) = A(I) + D(I)
      GO TO 20
   40 C = CV = 0
      DO 45 I = 1,10
      IF (V(I) .GT. 0) A(I) = A(I) / V(I) * 100
      C = C + A(I)
      IF (A(I) .GT. 0) CV = CV + 1
   45 CONTINUE
```

SET PROGRAM (CONTINUED)

```
      C = C / CV
      DO 50 I = 1,5
      B(I) = A(I) + A(I+5)
      IF (A(I) * A(I+5) .GT. 0) B(I) = B(I) / 2
   50 CONTINUE
      IF (KP .GT. 0) PUNCH 55, IDX, N, A, B, C
   55 FORMAT (A9, I3, 8X, 10F3, 5X, 5F3, F5)
      IF (KR .EQ. 0) GO TO 10
      PRINT 60,IDX,A,B,C,N
   60 FORMAT (*1*,14X,*SUMMARY OF STUDENT EVALUATION OF TEACHING*
     1 ///5X, *TEACHER IDENTIFICATION = *, A9 //
     2 5X, *RAW SCORES =*, 10F4, 3X, 5F4, 3X, F4 ///
     3 10X, *THE*, I3, * STUDENTS IN THIS CLASS SAID THAT IT IS*)
      DO 65 I = 1,10
      K = A(I) / 100 + 1.499
   65 PRINT LA(1,K), (LB(J,I), J = 1,6)
      PRINT 70
   70 FORMAT (//5X, *PAIRED ITEMS SUGGEST THAT THIS TEACHER IS*)
      DO 80 I = 1,5
      IF (B(I) .EQ. 0) GO TO 80
      M = L = 1
      IF (B(I) .LT. 250) M = 2
      K = ABS (B(I) - 250)
      IF (K .GT. 50) L = 2
      IF (K .GT. 100) L = 3
      PRINT 75, LE(L), (LC(J,M,I), J = 1,4)
   75 FORMAT (/A15, 4A10)
   80 CONTINUE
      K = C / 50 - 1
      PRINT 85, (LD(J,K), J = 1,8)
   85 FORMAT (//* IN GENERAL, THIS CLASS HAS *, 8A10)
      GO TO 10
      END
```

```
SET LABEL PACK AND EXAMPLE DECK.

(/5X,*(UNANSWERED) THAT THIS TEACHER *,6A10)
(/5X,*VERY FALSE THAT THIS TEACHER *,6A10)
(/5X,*RATHER FALSE THAT THIS TEACHER *,6A10)
(/5X,*RATHER TRUE THAT THIS TEACHER *,6A10)
(/5X,*VERY TRUE THAT THIS TEACHER *,6A10)
IS ALWAYS FRIENDLY TOWARD STUDENTS.
KNOWS A LOT ABOUT THE SUBJECT.
IS NEVER DULL OR BORING.
EXPECTS A LOT FROM STUDENTS.
ASKS FOR STUDENTS OPINIONS BEFORE MAKING DECISIONS.
IS USUALLY CHEERFUL AND OPTIMISTIC.
IS NOT CONFUSED BY UNEXPECTED QUESTIONS.
MAKES LEARNING MORE LIKE FUN THAN WORK.
DOESNT LET STUDENTS GET AWAY WITH ANYTHING
OFTEN GIVES STUDENTS A CHOICE IN ASSIGNMENTS.
FRIENDLY AND CHEERFUL.                          ALOOF AND COLD.
POISED AND KNOWLEDGEABLE.                       SELF-CONSCIOUS AND CONFUSED.
LIVELY AND INTERESTING.                         DULL AND BORING.
FIRM AND DEMANDING.                             EASILY DISTRACTED OR CONFUSED.
DEMOCRATIC IN PROCEDURE.                        AUTOCRATIC AND INFLEXIBLE.
A VERY UNFAVORABLE OPINION OF THIS TEACHER.
AN UNFAVORABLE OPINION OF THIS TEACHER.
A RATHER UNFAVORABLE OPINION OF THIS TEACHER.
A RATHER FAVORABLE OPINION OF THIS TEACHER.
A FAVORABLE OPINION OF THIS TEACHER.
A VERY FAVORABLE OPINION OF THIS TEACHER.
SLM  F011          4423343223
SLM  F021          3323144232
SLM  F032          4413243231
SLM  F041          4424144341
SLM  F051          4334233134
SLM  F061          4413344223
SLM  F071          3434344334
SLM  F082          4434344343
SLM  F091          3322233334
SLM  F102          4434344333
SLM  F111          4444344334
SLM  F121          3433244322
SLM  F132          4434244443
SLM  F142          4433344333
SLM  F151          4414344233
SLM  F161          4434144322
```

SUMMARY OF STUDENT EVALUATION OF TEACHING

TEACHER IDENTIFICATION = SLM F161

RAW SCORES = 375 381 244 350 231 388 375 263 294 281 381 378 253 32 256 318

THE 16 STUDENTS IN THIS CLASS SAID THAT IT IS

VERY TRUE THAT THIS TEACHER IS ALWAYS FRIENDLY TOWARD STUDENTS.

VERY TRUE THAT THIS TEACHER KNOWS A LOT ABOUT THE SUBJECT.

RATHER FALSE THAT THIS TEACHER IS NEVER DULL OR BORING.

RATHER TRUE THAT THIS TEACHER EXPECTS A LOT FROM STUDENTS.

RATHER FALSE THAT THIS TEACHER ASKS FOR STUDENTS OPINIONS BEFORE MAKING DECISIONS.

VERY TRUE THAT THIS TEACHER IS USUALLY CHEERFUL AND OPTIMISTIC.

VERY TRUE THAT THIS TEACHER IS NOT CONFUSED BY UNEXPECTED QUESTIONS.

RATHER TRUE THAT THIS TEACHER MAKES LEARNING MORE LIKE FUN THAN WORK.

RATHER TRUE THAT THIS TEACHER DOESNT LET STUDENTS GET AWAY WITH ANYTHING

RATHER TRUE THAT THIS TEACHER OFTEN GIVES STUDENTS A CHOICE IN ASSIGNMENTS.

PAIRED ITEMS SUGGEST THAT THIS TEACHER IS

VERY FRIENDLY AND CHEERFUL.

VERY POISED AND KNOWLEDGEABLE.

RATHER LIVELY AND INTERESTING.

QUITE FIRM AND DEMANDING.

RATHER DEMOCRATIC IN PROCEDURE.

IN GENERAL, THIS CLASS HAS A FAVORABLE OPINION OF THIS TEACHER.