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ABSTRACT

This investigation studied the effect of teaching satisfaction and related classroom environmental variables on student evaluations of instruction where the assigned instructor and course subject were held constant over two successive academic terms at a branch campus of a major state university. Scores on two dimensions of teaching, Instructor and Course, were derived from factor analysis of the class means of a 10-item student rating device administered to 1,785 subjects. Teacher satisfaction and related classroom data were obtained from a self-reporting instrument on 51 classes that were matched across terms for instructor and subject. The two factor score ratings and the 14-item self-reports of the instructors were treated as dependent and independent variables, respectively, in multiple regression analyses conducted for each term. Coefficients of factor congruence, across terms, were .93 for Instructor and .78 for Course. There were no statistically-significant mean differences between terms for the student rating or self-report scales. There were seven common satisfaction and classroom variables that best predicted the dominant Instructor evaluation, differing only slightly each term in the order they entered the step-wise regression equation. The multiple correlations (R) for the two terms were .63 and .64 accounting for 40-percent of the criterion variance. (Author)

CORRELATES OF STUDENT RATINGS OF COLLEGE INSTRUCTION WITH TEACHER SATISFACTION AND RELATED COURSE VARIABLES

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CORRELATES OF STUDENT RATINGS OF COLLEGE INSTRUCTION WITH TEACHER SATISFACTION AND RELATED COURSE VARIABLES

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Background

The purpose of this paper was to report the effect of teacher satisfaction and certain related course variables on the outcome of student instructional ratings in a selected sample of 51 classes at a two-year upper-division branch campus of a major state university where all courses had been systematically evaluated for two consecutive academic terms. The specific aspects of teaching performance being rated were described in the context of relevant indicators of teaching satisfaction such as assignment, teaching load, classroom facilities, and in related course variables including enrollment, course level, and instructor rank. Factor analysis and multiple regression analysis were used in this study with a view toward sustaining or rejecting the notion that student ratings are a function of teacher satisfaction, and that such ratings exhibit invariance or stability over succeeding terms.

Reviews of the literature on the extent to which student course ratings are influenced by instructional variables generally report inconclusive or contradictory findings (Costin, Greenough & Menges, 1971; McKeachie, 1973; Owen, 1974; and others). Research on the effect of teaching satisfaction on these evaluations is especially meager and has only been hinted at in terms of teacher personality in some of the work cited by Costin et al (1971). Grush and ~~Menges~~ Costin (1975) have suggested that instructor input on course information be used to cross-validate some of the recurrent teacher "traits" that are usually identified in student ratings.

Procedures

The research instruments used in this study were the University Instructional Survey (UIS) and the University Instructional Survey Informational Sheet (UISIS) (see Appendices 1 & 2). The locally-adopted UIS was used as the student rating device with 10 Likert-type items to which students responded on a five-step scale. The UISIS was a 14-item information sheet used by the faculty to report on teaching satisfaction and some related course variables and was adapted from similar forms used by ETS and Temple University (Sockloff & Deabler, 1971).

The response data were collected on a total of 1,785 students administered the UIS at the Capitol Campus of the Pennsylvania State University during the Winter and Spring terms of 1974. These data represented 51 undergraduate and graduate classes each term covering broad discipline areas of administration, engineering and technology, and the social sciences. The 51 pairs of classes chosen for this study were based on the same instructor teaching an identical course, continuation course (e.g., Chem. 201-202), or a complementary course (e.g., Educ. 455 Math in Elementary Schools--Math. 303 Geometry for Elementary School Teachers), and further on whom complete data for the UIS and UISIS were available.

UIS item means were computed for each class both terms and the generated 10 by 10 intercorrelation matrices, representing between-instructor covariation, were submitted to principal-components analysis with highest off-diagonal elements as estimates of communality. Two-factor (component) solutions were extracted and followed by orthogonal (Varimax) rotation. The congruences of both components across both terms were computed using an orthogonal least-squares matrix-fitting algorithm programmed by Pennell and Young (1967). Factor (component) scores were then computed (Harman, 1967).

The component scores for the respective academic terms were then treated as dependent or criterion variables in a step-wise multiple regression analysis following a strategy used in a similar regression study by Brown (1974). The 14 UISIS items were used as the independent or predictor variables. In each "first" step-wise regression analysis, seven of the UISIS items that were most descriptive of classroom environmental variables (1,2,6,7,9,10 & 13) were reduced to an optimal subset (i.e., subset of predictors with the smallest standard error of estimate). The "second" step-wise regression analysis then tested the importance of the seven remaining satisfaction variables (3,4,5,8,11,12 & 14) as predictors of the factor score ratings.

The variables in the optimally-reduced subset entered the "second" regression equation in the same sequence that they entered the prior regression equation, followed by the satisfaction variables in the order of their ability to improve the multiple correlation (R). This served to test the incremental influence of the satisfaction variables with a portion of the variance partialled-out. This process was repeated for each factor score rating for both academic terms. Procedures for estimating the amount of shrinkage of the Mult R and conducting a cross-validation followed those of Kerlinger and Pedhazur (1973). The Winter data were used as the "screening" sample and the Spring data as the "calibration" sample.

Results and Conclusions

The "t" tests conducted on the means of the corresponding items of the UIS and UISIS for the Winter and Spring terms showed no statistically significant differences (Table 1). The principal-components analyses yielded two dimensions underlying the UIS that accounted for all of the items and 96-percent of their variance. These components, descriptive of the teaching performance being rated, were labelled (with their respective alpha reliabilities) as: I--Instructor (.99 & .94); and II--Course (.97 & .97). An inspection of the factor-loading matrix revealed Instructor to be invariant in respect to UIS items 2,5,7 & 9, and Course invariant in items 1,3,6 & 10, with "fugitive" items 4 and 8 tending to share their variances with both components (Table 2). Correlation of the components across terms was Instructor .93, and Course .78. Goodness-of-fit measures indicated the average cosine of the angle between corresponding vectors of .82, and a correlation of the interpoint distances of .72.

The results of the first stepwise multiple regression on the Instructor factor score for the Winter term are presented in Table 3A. The four variables above the dashed line comprise the optimally-reduced subset of the initial battery of seven UISIS classroom environmental variables. In sum they account for 15% of the variance in the Instructor rating. The results of the second stepwise regression analysis are displayed in Table 3B. Item 14 "Satisfaction being assigned to teach the course" was the single best predictor of the Instructor rating for that term. Moreover, the addition of the satisfaction variables (14,3,12 & 5) to the optimally-reduced subset significantly improved the Mult R from .39 to .63. The final, improved regression equation explained almost 40% of the criterion variance.

In like fashion, the results of the first and second multiple regression equations for the Course factor rating may be interpreted (Tables 4A & 4B).

UISIS Item 7 "Number of major revisions" from the classroom environmental group was the best single predictor of the Course criterion variable. The addition of the two most influential satisfaction variables (5 & 8) only improved the R moderately from .45 to .55, accounting for a total of 30% of the criterion variance.

The regression equations for the Instructor and Course criterion variables for the Spring term were marked by similarity and dissimilarity, respectively, with their Winter counterparts. There were seven common variables (3,5,6,7,9,10 & 12) that in the aggregate were the best predictors of Instructor across both terms and differed only in the order in which they entered the first and second stepwise regression equations (Tables 5A & 5B). The magnitude of their R's was a comparable .64 for Spring and .63 for Winter. For the Course criterion variable across both terms, the first stepwise regression equation shared only two variables in common from the classroom environmental group (1 & 10). There were no common variables from the satisfaction group in the second stepwise regression equation (Tables 6A & 6B).

Due to the above disparity in the Course criterion variables, a cross-validation was attempted on the Instructor criterion variables only. The R for the Winter "screening" sample shrank from .63 to .27 when the B weights were applied to the predictor variables for the Spring "calibration" sample. In a double cross-validation, the R for the Spring "calibration" sample shrank from .64 to a comparable .27 when its B weights were applied to the Winter "screening" sample.

It was concluded that a substantial amount (approximately 40%) of the total variance in student ratings of instruction can be attributed to certain satisfaction and classroom variables related to teaching. There is evidence that such ratings tend to be stable or invariant over successive terms where instructor and subject matter have been held constant as in this study.

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The Pennsylvania State University-The Capitol Campus-UNIVERSITY INSTRUCTIONAL SURVEY

Use #2 pencil. Do not use ball point pen or red pencil. Cleanly erase all unintended marks.

The purpose of this form is to obtain general information on the adequacy of instruction in this course.

A. Please answer the following questions directly on this sheet.

Today's Date:_____ Instructor:_____ Course:_____ Section:_____

Program Enrolled:_____ Course Code Number[ ][ ][ ] Your term standing:_____

Course required: yes ( ) no ( ) Pass-Fail option: yes ( ) no ( ) Cumulative GPA:_____

Hours preparation spent per week:_____ Estimated percentage of your class attendance:_____

B. PRINT the instructor's name, course, and date in the spaces provided on the left side of the C-1 answer sheet. DO NOT write or code your name on either sheet.

C. Put the code number for this course on the answer sheet in the SOCIAL SECURITY NUMBER area (blocks 1, 2 and 3). Darken the spaces corresponding to the code in these first three columns.

D. Complete items 1-10 below by responding on the answer sheet at numbers 1-10.

For each item, darken only one space a b c d or e that best corresponds to your opinion. The most favorable response is a and the least favorable response is e.

1. Relative to my effort, I learned	much	a b c d e	little
2. The instructor's attitude towards students was	positive	a b c d e	negative
3. Course objectives were	clearly stated	a b c d e	unclear
4. The instructor made the course material	very interesting	a b c d e	dull
5. The instructor communicated ideas	very clearly	a b c d e	poorly
6. Interest in the subject, as a result of taking this course, was	stimulated	a b c d e	reduced
7. Knowledge of progress, given during the course, was	very adequate	a b c d e	little or none
8. The method of instruction	enhanced learning	a b c d e	impeded learning
9. Overall rating of the instructor:	outstanding	a b c d e	very poor
10. Overall rating of the course:	outstanding	a b c d e	very poor

E. Complete questions 11, 12, and 13 on the back of this sheet.

APPENDIX I

Return both sheets to the student administering the survey.

NAME_____ COURSE_____ CODE #_____

THE PENNSYLVANIA STATE UNIVERSITY-THE CAPITOL CAMPUS

UNIVERSITY INSTRUCTIONAL SURVEY INFORMATION SHEET

Use #2 pencil. Do not use ball point pen or red pencil. Cleanly erase all unintended marks. Transcribe your responses to the C-1 answer sheet provided.

The purpose of this form is to obtain data on various environmental factors, both controlled and uncontrolled, that influence student ratings on courses and instructors. This information will assist in evaluation review and the establishment of norms based on the relevant factors.

A. We have printed the following information in the left margin of the C-1 answer sheet. Please make any necessary corrections.

"Full name"	Your last name and first initial
"Instructor"	Your program
"Course"	Course abbreviation, number, section
"Date"	(Current term abbreviation)

B. We have already entered the special University Instructional Survey code number for this course in the first three spaces of the social security number. This number corresponds to the code used on your student course survey this term. Similarly, we have coded a two-letter abbreviation of your program in the "last name" area. Please make any corrections.

C. Beginning with Item 1 on the C-1 answer sheet, darken only one space a b c d or e that corresponds with your response for each item. All questions relate to the current term.

Course Information:

1. Class enrollment: (a=1-10; b=11-20; c=21-30; d=31-50; e=over 50) a b c d e

2. Course level: (a=introductory baccalaureate; b=intermediate; c=advanced; d=graduate) a b c d

3. Class period: (a=1,2; b=3,4,5; c=6,7; d=early evening; e=late evening) a b c d e

4. Suitability of classroom and [illegible]pment graduated on a scale of a to e: (a=most satisfactory; e=least satisfactory) a b c d e

5. Appropriateness of course prerequisites graduated on a scale of a to d: (a=appropriate; d=inappropriate) (e=no prerequisites) a b c d e

6. Method of instruction: (a=lecture mainly; b=lecture & discussion; c=discussion mainly; d=laboratory; e=other) a b c d e

7. Major revisions in the method of instruction in this course during the past: (a=1 yr.; b=2 yrs.; c=3 yrs.; d=4 or more yrs.; e=no change) a b c d e

8. Range of student ability graduated on a scale of a to d: (a=advanced; d=below average) (e=normal distribution) a b c d e

Instructor Information:

9. Instructor rank: (a=teaching graduate assistant; b=instructor; c=assistant professor; d=associate professor; e=professor) a b c d e

10. Total number years of college teaching: (a=0-1; b=1-2; c=2-6; d=6-12; e=over 12) a b c d e

11. Credit hour teaching load this term: (a=1-3; b=4-6; c=7-9; d=10-12; e=over 12) a b c d e

12. Number of other sections of this course taught by you this term: (a=0; b=1; c=2; d=3; e=over 3) a b c d e

13. Number of times you have previously taught this course: (a=0; b=1-2; c=3-5; d=6-10; e=over 10) a b c d e

14. Satisfaction being assigned to teach this course this term, graduated on a scale of a to e: (a=very satisfied; e=very dissatisfied) a b c d e

(Optional: Open-ended comments clarifying your responses should be written on reverse side of the answer sheet)

RETURN C-1 ANSWER SHEET TO W-338 BY THE LAST DAY OF CLASS.

APPENDIX II

TABLE 1

COMPARATIVE ITEM STATISTICS FOR THE UIS AND UISIS BY ACADEMIC TERM

Instrument/ Item No.		Winter Mean	Winter S.D.	Spring Mean	Spring S.D.	t*
UIS	1	4.14	0.49	4.14	0.40	0.084
	2	4.33	0.50	4.38	0.49	0.539
	3	4.02	0.57	4.10	0.52	0.770
	4	3.88	0.59	3.90	0.59	0.114
	5	4.01	0.53	4.03	0.57	0.187
	6	4.01	0.56	4.01	0.52	0.000
	7	3.90	0.50	3.82	0.48	0.828
	8	3.92	0.60	3.93	0.52	0.055
	9	4.05	0.58	4.06	0.57	0.110
	10	3.84	0.57	3.86	0.46	0.170
UISIS	1	2.39	0.98	2.71	0.97	1.628
	2	2.22	1.01	2.39	0.80	0.980
	3	3.65	1.48	3.63	1.61	0.632
	4	3.67	1.18	4.02	1.14	1.538
	5	3.96	1.25	4.00	1.15	1.643
	6	2.67	1.51	2.84	1.48	0.598
	7	3.24	1.77	3.06	1.78	0.501
	8	2.86	0.90	3.04	0.77	1.065
	9	3.14	0.80	3.16	0.78	0.126
	10	3.45	1.10	3.53	1.03	0.371
	11	3.00	0.87	2.94	0.71	0.374
	12	4.69	0.76	4.90	0.30	1.882
	13	2.65	1.28	2.55	1.10	0.415
	14	4.39	0.83	4.49	0.67	0.657

t> 1.980 significant at .05 level (two-tail)

TABLE 2

UIS COMPONENT LOADING MATRICES USING ORTHOGONAL TRANSFORMATIONS[a]

Item No.	Winter Instructor(I)	Winter Course(II)	Item No.	Spring Instructor(I)	Spring Course(II)
1	39	87	1	36	84
2	82	29	2	78	43
3	59	64	3	51	69
4	72	56	4	60	73
5	77	51	5	72	62
6	46	85	6	40	83
7	71	43	7	68	24
8	73	62	8	59	75
9	87	43	9	77	60
10	41	88	10	39	87
9	87		2	78	
2	82		9	77	
5	77		5	72	
8	73		7	68/	
4	72		10		87
7	71/		1		84
10		88	6		83
1		87	8		75
6		85	4		73
3		64/	3		69/
Total Variance Accounted For:	50.1%	45.8%		41.2%	54.0%

aLoadings multiplied by 100 and rescaled to eliminate negative items/

TABLE 3A

REDUCTION OF INITIAL BATTERY OF PREDICTOR VARIABLES: INSTRUCTOR W74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
10	Years College Teaching	.25265	.06383	.06383	1.02248	.25265	3.34 ns
6	Method of Instruction	.32085	.10294	.03911	1.01127	.20579	2.75 ns
9	Instructor Rank	.35985	.12949	.02655	[illegible]	.01058	2.33 ns
7	No. Major Revisions	.39167	.15341	.02392	1.00354	-.16492	2.08 ns
2	Course Level	.40731	.16590	.01249	1.00711	.13042	1.79 ns
13	No. Times Taught	.41122	.16910	.00320	1.01654	.03450	1.49 ns
1	Class Enrollment	.41179	.16957	.00047	1.02800	.12327	1.25 ns

TABLE 3B

SEVEN SATISFACTION VARIABLES ADDED TO OPTIMALLY-REDUCED SUBSET: INSTRUCTOR W74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
10	Years College Teaching	.25265	.06383	.06383	1.02248	.25265	3.34 ns
6	Method of Instruction	.32085	.10294	.03911	1.01127	.20579	2.75 ns
9	Instructor Rank	.35985	.12949	.02655	1.00673	-.01058	2.33 ns
7	No. Major Revisions	.39167	.15341	.02392	1.00354	-.16492	2.08 ns
14	Assignment Satisfaction	.58659	.34408	.19067	.89309	.46103	4.72***
3	Class Period	.60456	.36549	.02141	.88832	.00807	4.22***
12	No. Other Sections	.61828	.38227	.01677	.88663	.05963	3.80***
5	Course Prerequisites	.63158	.39889	.01663	.88497	-.19085	3.48***
4	Suitability Classroom	.64181	.41191	.01302	.88594	-.01145	3.19**
11	Teaching Load	.64370	.41435	.00243	.89509	-.04066	2.83**
8	Range Student Ability	.64470	.41564	.00129	.90549	-.01993	2.52*

*** $p < .001$ ** $p < .01$ * $p < .05$ ns $p > .05$

TABLE 4A

REDUCTION OF INITIAL BATTERY OF PREDICTOR VARIABLES: COURSE W74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
7	No. Major Revisions	.25711	.06610	.06610	1.01504	-.25711	3.47 ns
1	Class Enrollment	.35010	.12257	.05647	.99407	-.24720	3.35*
9	Instructor Rank	.39132	.15313	.03056	.98694	.22365	2.83*
10	Years College Teaching	.45109	.20348	.05035	.96750	-.11237	2.94*
13	No. Times Taught	.46801	.21903	.01555	.96859	-.12280	2.52*
2	Course Level	.48137	.23172	.01269	.97155	-.09978	2.21 ns

* $p < .05$ ns $p > .05$

TABLE 4B

SEVEN SATISFACTION VARIABLES ADDED TO OPTIMALLY-REDUCED SUBSET: COURSE W74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
7	No. Major Revisions	.25711	.06610	.06610	1.01504	-.25711	3.47 ns
1	Class Enrollment	.35010	.12257	.05647	.99407	-.24720	3.35*
9	Instructor Rank	.39132	.15313	.03056	.98694	.22365	2.83*
10	Years College Teaching	.45109	.20348	.05035	.96750	-.11237	2.94*
5	Course Prerequisites	.53135	.28233	.07885	.92851	-.19258	3.54**
8	Range Student Ability	.54988	.30236	.02004	.92581	.06052	3.18*
11	Teaching Load	.55521	.30826	.00590	.93254	.11751	2.74*
3	Class Period	.55948	.31302	.00476	.94033	.13354	2.39*
12	No. Other Sections	.56133	.31509	.00207	.95029	-.17725	2.10 ns
4	Suitability Classroom	.56289	.31684	.00175	.96086	-.03578	1.86 ns

** $p < .01$ * $p < .05$ ns $p > .05$

TABLE 5A

REDUCTION OF INITIAL BATTERY OF PREDICTOR VARIABLES: INSTRUCTOR SP74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
7	No. Major Revisions	.34665	.12016	.12016	1.04460	-.34665	6.69*
6	Method of Instruction	.42034	.17668	.05652	1.02097	-.24421	5.15**
10	Years College Teaching	.48647	.23665	.05997	.99348	.26202	4.86**
9	Instructor Rank	.56804	.32267	.08601	.94596	-.05731	5.48***
13	No. Times Taught	.57315	.32850	.00584	.95228	-.00334	4.40***
1	Class Enrollment	.57876	.33495	.00646	.95840	-.18280	3.69**
2	Course Level	.58092	.33747	.00251	.96765	-.00376	3.13**

*** $p < .001$ ** $p < .01$ * $p < .05$

TABLE 5B

SEVEN SATISFACTION VARIABLES ADDED TO OPTIMALLY-REDUCED SUBSET: INSTRUCTOR SP74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
7	No. Major Revisions	.34665	.12016	.12016	1.04460	-.34665	6.69*
6	Method of Instruction	.42034	.17668	.05652	1.02097	-.24421	5.15**
10	Years College Teaching	.48647	.23665	.05997	.99348	.26202	4.86**
9	Instructor Rank	.56804	.32267	.08601	.94596	-.05731	5.48***
5	Course Prerequisites	.59347	.35220	.02954	.93532	.06571	4.89***
3	Class Period	.61061	.37284	.02064	.93070	-.20955	4.36***
12	No. Other Sections	.62441	.38989	.01704	.92858	.24846	3.93***
4	Suitability Classroom	.63873	.40798	.01809	.92553	-.04715	3.62***
11	Teaching Load	.64480	.41577	.00779	.93057	-.18082	3.24**
8	Range Student Ability	.64917	.42142	.00565	.93756	-.15051	2.91**
14	Assignment Satisfaction	.65063	.42331	.00189	.94795	.06762	2.60*

*** $p < .001$ ** $p < .01$ * $p < .05$

TABLE 6A

REDUCTION OF INITIAL BATTERY OF PREDICTOR VARIABLES: COURSE SP74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
1	Class Enrollment	.43916	.19286	.19286	.97025	.43916	11.71***
10	Years College Teaching	.51124	.26137	.06851	.93778	.35225	8.49***
2	Course Level	.52393	.27451	.01314	.93923	.20495	5.93***
9	Instructor Rank	.53570	.28698	.01247	.94119	.15244	4.63***
6	Method of Instruction	.54361	.29551	.00853	.94588	.26439	3.78**
7	No. Major Revisions	.54703	.29924	.00373	.95403	.09965	3.13*
13	No. Times Taught	.54778	.30006	.00082	.96450	.02755	2.63*

*** $p < .001$ ** $p < .01$ * $p < .05$

TABLE 6B

SEVEN SATISFACTION VARIABLES ADDED TO OPTIMALLY-REDUCED SUBSET: COURSE SP74

UISIS No.	Variable	R	R^2	Incr.R^2	Est.SE	r	F
1	Class Enrollment	.43916	.19286	.19286	.97025	.43916	11.71***
10	Years College Teaching	.51124	.26137	.06851	.93778	.35225	8.49***
12	No. Other Sections	.54731	.29954	.03818	.92288	.28097	6.70***
14	Assignment Satisfaction	.57293	.32825	.02870	.91355	.18105	5.62***
4	Suitability Classroom	.58698	.34455	.01630	.91237	.17536	4.73***
11	Teaching Load	.60000	.36000	.01546	.91173	.05083	4.13***
8	Range Student Ability	.60496	.36598	.00597	.91796	.12195	3.55**
5	Course Prerequisites	.60860	.37040	.00442	.92558	.08767	3.09**
3	Class Period	.60879	.37063	.00023	.93663	-.11933	2.68*

*** $p < .001$ ** $p < .01$ * $p < .05$