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AUTHOR Arnfield, Edwin A.
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ABSTRACT

The effect of the independent variable of bargaining impasse on student attitude toward the biology course, toward learning and toward affective course goals in biology was studied by this investigator. Evaluation was done on a post-exposure basis utilizing data from two schools of presumably similar groups who had experienced similar situations except for the independent variable. The use of an opinionnaire by students in the general biology course provided data of biographic nature, attitudinal data toward collective bargaining and opinions about the adverse effects of bargaining on the teaching/learning process. Student attitudes toward collective bargaining in general were positive. Students were neutral in their attitudes toward sanctions and the use of strikes. The groups differed significantly in their attitude toward the bargaining impasse with students who had experienced that impasse negative in their attitudes and the other group neutral. Male students were more positive than were females. Correlational data analysis also showed those students who had a negative attitude toward collective bargaining impasse saw that impasse as an important adverse influence on their learning. An extended impasse collective bargaining situation was seen as an important adverse influence by students. (Author/EB)

A STUDY OF THE RELATIONSHIP BETWEEN COLLECTIVE BARGAINING IMPASSE AND THE ATTITUDES OF BIOLOGY STUDENTS IN TWO URBAN COMMUNITY COLLEGES IN MICHIGAN

Edwin A. Arnfield
Professor of Biology
Division of Mathematics and Science
Macomb County Community College
Warren, Michigan

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INTRODUCTION

The decade of the 1960's saw the emergence in higher education of a new phenomenon known as collective bargaining, an adversary procedure for achievement of work contracts for faculty in institutions of higher education such as colleges and universities, and junior and community colleges. This process, which culminates with agreement upon a written contract that regulates a vast number of faculty procedures and activities, can become potentially injurious to all parties concerned when the discussion processes of collective bargaining break down, as they frequently do with resultant work stoppages and impasses. Although the agreement itself constitutes a significant influence of society upon biologists and biology instruction, the breakdown of the bargaining process itself may be an even greater short-term influence.

A vast amount of time and effort is being devoted to examining the conditions under which instruction in biology

takes place and one frequently used means of solving the problems of the community college biologist has been by utilization of collective bargaining to provide written contracts which specify and limit working conditions of faculty members[1,2,3,4,5,6,7,8,9]. Ten to fifteen percent of all collegiate faculties across the nation are already under the aegis of collective bargaining statutes and it is predicted that more will join their ranks in the not too distant future. Collective bargaining is a problem solving process which each year has increased in breadth as it encompasses faculty committee structure, curriculum, budget, tenure and other aspects of faculty-related activity in the community colleges[10,11,12,13,14,15,16,17]. But if an impasse occurs, the situation can be prolonged for days or months. It would be of value to show that such a climate is damaging to the faculty and students as well as the intellectual climate for teaching-learning. Negotiators from both sides of the bargaining table could then have a better understanding of the relationship between the bargaining climate and the intellectual climate of the institution. At the same time the biologist who is a member of the faculty of such an institution could be more aware of these same relationships and could plan ahead in his own teaching to strive actively to separate the classroom atmosphere from the atmosphere of negotiations.

Although a few investigators have studied the phenomenon of collective bargaining, the review of literature pertinent to teacher strikes and student attitudes toward them shows both a superficiality of questioning technique with early elementary children and a complete lack of any study to be found which related

those attitudes to any academic discipline[18,19,20,21,22,23,24]. Until the work of the present author, collective bargaining has been dealt with in opinionnaires for public school teachers and community college faculty, but not with community college students[25]. This study was designed to determine what relationships exist between the collective bargaining process in the community college and:

a. the attitudes of students in an introductory general biology course toward that process,
b. the attitudes of students in an introductory general biology course toward their own learning,
c. student attitudes toward affective course goals in biology.

To obtain the relevant information, four research hypotheses were generated.

DESIGN

The design of the study was for a research setting for which no data were available prior to exposure to the independent variable of bargaining impasse. Evaluation was done on a post-exposure basis utilizing data from two schools of presumable similar groups who had gone through the same situations except for the independent variable. One school experienced no impasse in a collective bargaining situation and the other experienced a faculty strike and an extended impasse collective bargaining situation during the semester in which the students were enrolled in classes. The students were randomly selected and placed into

subgroups at each school: students from an impasse school who answered in terms of Autumn, 1972; students from an impasse school who answered in terms of Autumn, 1973; students from a non-impasse school who answered in terms of Autumn, 1972; and students from a non-impasse school who answered in terms of Autumn, 1973. Tests of significance in this factorial design were by means of F-ratios computed by multivariate analysis of variance and covariance between the four groups. It was thus necessary to test for Impasse x Time Perspective Interaction Effect, Impasse Main Effect, and Time Perspective Main Effect with all student analyses.

DATA AND ITS SOURCES

The basic plan to secure data was through use of an opinionnaire responded to by all students enrolled in general biology courses at two Michigan community colleges. Part one elicited biographic information, part two was a Likert-type scale to measure attitudes toward collective bargaining, part three consisted of three sets of ranking items to measure opinion about the adverse effects of bargaining on the teaching/learning process. Part four was a group of semantic differential scales to measure attitude toward bargaining impasse, sanctions, faculty strikes and ten selected attitudinal goals in biology. Reliabilities of the various scales used in the study are shown in Table 1 and Table 2.

THE STUDY POPULATION

In September, 1972, there were 673 students enrolled in the

TABLE 1

RELIABILITY OF THE CARLTON-MOORE COLLECTIVE BARGAINING SCALE

Researcher	Year	Reliability	Method
Carlton	1966	0.84	Split-half method
Moore	1970	0.92	Kuder Richarson Formula 20
Current Pilot Study	1973	0.84	Cronbach Alpha[a]
Current Major Study	1973	0.87	Cronbach Alpha[a]

[a] BMDQ2V Analysis of Variance for unbalanced factorial design using Hoyt ANOVA method.

TABLE 2

RELIABILITIES OF THE SEMANTIC DIFFERENTIAL SCALES IN THE PILOT STUDY AND THE MAJOR STUDY AS DETERMINED BY THE CRONBACH ALPHA FORMULA

Scale #	Item	Reliability	
		Pilot Study	Major Study
4	Bargaining Impasse	0.87	0.91
7	Sanctions in Bargaining	0.90	0.92
13	Use of Strikes - Teachers	0.85	0.88
1	Fostering Openmindedness	0.77	0.82
2	Valuing Logical Reasoning	0.76	0.84
3	Rejection of Myth	0.89	0.89
5	Scientific Attitudes	0.92	0.89
6	Interaction, Science & Arts	0.89	0.91
8	Science	0.88	0.89
9	Scientific Literacy	0.87	0.90
10	Methods of Science	0.80	0.90
11	Limitations of Science	0.86	0.91
12	Science Part of Modern Living	0.87	0.91
		N = 37	N = 390

introductory general biology course at the South Campus of Macomb County Community College. Following some exclusions, the study was undertaken by mailing an opinionnaire to each of the 560 remaining students. Concurrently, at Oakland Community College there were a total of 396 students enrolled in the introductory general biology course. The population thus included 956 students.

THE STUDY SAMPLE

The response rates of the student groups are compared in Table 3. Of the 560 Macomb students who received opinionnaires, 255 or 50.2 percent returned them completed. Of the 396 Oakland students who received opinionnaires, 135 or 42.0 percent returned them completed. These returns resulted in the four groups of students for the study.

EQUIVALENCE OF THE STUDENT GROUPS

The student groups were compared for equivalence using the student biographic variables. This was accomplished by use of two way multivariate and univariate analysis of variance. The student biographic variables used were: years since high school graduation, sex, full-time or part-time student, veteran, continue education beyond the community college, attend a college or university, major in science, recorded grade in biology.

The samples of students from Macomb and Oakland Community colleges differ significantly in terms of three biographic variables. In terms of time perspective and impasse effect Macomb students had higher grades than Oakland students. In

TABLE 3

USABLE STUDENT RESPONSE BY INSTITUTION

Macomb						Oakland					
Time 1[a]			Time 2[b]			Time 1			Time 2		
# Sample	# returns	% returns	# Sample	# returns	% returns	# Sample	# returns	% returns	# Sample	# returns	% returns
280	137	48.8	280	118	42.3	198	69	35.0	198	66	33.4

[a] Answered in terms of the Time Perspective of Autumn, 1972 (the impasse semester).
[b] Answered in terms of the Time Perspective of Autumn, 1973 (one year later).

Population Total	560	Population Total	396
Macomb Total Usable returns	255	Oakland total Usable returns	135
Returned: no address	14	Returned: no address	15
Refused to answer and returned	13	Refused to answer and returned	16
Total response	282	Total response	166
Percentage of Response	50.2	Percentage of Response	42.0

terms of impasse effect, Oakland students have been out of school longer and there were more males in the sample than there were at Macomb. Correlational and stepwise regression analysis were also performed utilizing the variables but no new evidence was contributed. The covariates were generally independent.

ANALYSIS OF THE STUDENT HYPOTHESES

Hypothesis 1: There will be no difference between students who enrolled in class during an extended impasse collective bargaining situation and students enrolled in class during a non-impasse situation in their attitude toward collective bargaining as measured by responses to a thirty item Likert type opinionnaire and three semantic differential scales concerning Bargaining Impasse, Use of Sanctions in Bargaining, and Use of Strikes by Teachers.

Dependent Variables:	Independent Variables:
1. Collective Bargaining Total Score.	1. Impasse bargaining.
2. Semantic differential attitude scales concerning: (a) Bargaining Impasse, (b) Use of Sanctions in Bargaining, (c) Use of Strikes by Teachers.	2. Time perspective of response (a) Autumn, 1972 (impasse semester), (b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, 2 x 2, two way multivariate

and univariate analyses of covariance for F-ratios, adjusted group means and standard deviations.

The test of equality of regression indicated the covariate Sex could be used in the analyses.

Hypothesis 2: There will be no difference between a student who enrolled in a class during an extended impasse collective bargaining situation and a student who enrolled in a class during a non-impasse situation in terms of how they rank Collective Bargaining and Bargaining Impasse as more important adverse influences.

Dependent Variables:

1. Rank Importance of:
   (a) Collective Bargaining
   (b) Bargaining Impasse as adverse influences on learning effectiveness.
2. Impact Index.

Independent Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time Perspective of response:
   (a) Autumn, 1972 (Impasse semester).
   (b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, 2 x 2, two way multivariate and univariate analyses of variance for F-ratios, group means and standard deviations.

Hypothesis 3. There will be no difference between a student who enrolled in a class during an extended impasse collective bargaining situation and a student who enrolled in a class during a non-impasse situation in terms of their attitude toward affective

course goals in biology as measured by their responses to ten sets of semantic differential scales concerning affective course goals in biology.

Because different combinations of covariates were needed with the affective course goals variables, they were divided into two groupings for the purpose of analysis of covariance. Four of the variables were placed in Group I and analyzed with the covariates Years Since High School Graduation and Course Grade in Biology. Six of the variables were place in Group II and analyzed with the covariates Major in Science and Course Grade in Biology.

Dependent Variables:

1. Semantic differential scales concerning affective course goals in biology:
   (a) Fostering of openmindedness,
   (b) Valuing logical reasoning,
   (c) Rejection of myth and superstition,
   (d) Scientific attitudes,
   (e) Interaction of sciences and the arts,
   (f) Science,
   (g) Scientific literacy,

Independent Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time Perspective of response:
   (a) Autumn, 1972 (impasse semester),
   (b) Autumn, 1973 (one year later).

(h) Methods and procedures of science,

(i) Appreciation of the limitations of science,

(j) Science as a basic part of modern living.

Analysis procedure: Clyde MANOVA, 2 x 2, two way multivariate and univariate analyses of covariance for F-ratios, adjusted group means and standard deviations.

The test of equality of regression indicated that the covariates could be used in the analysis.

Hypothesis 4: Relationships exist between and among the student variables such that they could be used to predict the criterion variables.

Analysis procedure: BMDO2R, stepwise regression analysis and correlational analysis, BMDO8M, factor analysis.

RESULTS

Attitudes of students in an introductory general biology course toward collective bargaining.

1. There was a significant difference in student attitudes toward Collective Bargaining Impasse in terms of impasse by time perspective interaction effect. The students who had experienced an extended impasse collective bargaining situation were more negative than students who had not experienced an impasse situation, Table 4, Table 5 and Figure 1.

TABLE 4

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE BY TIME PERSPECTIVE INTERACTION EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	1.949	4.000	362.000	0.102

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Collective Bargaining Total Score	0.388	71.375	0.534
Bargaining Impasse	4.684	543.414	0.031**
Use of Sanctions in Bargaining	1.425	161.105	0.233
Use of Strikes by Teachers	1.454	185.648	0.229

** $p \leq 0.05$

TABLE 5

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING
ADJUSTED MEANS

Estimates adjusted for 1 covariates

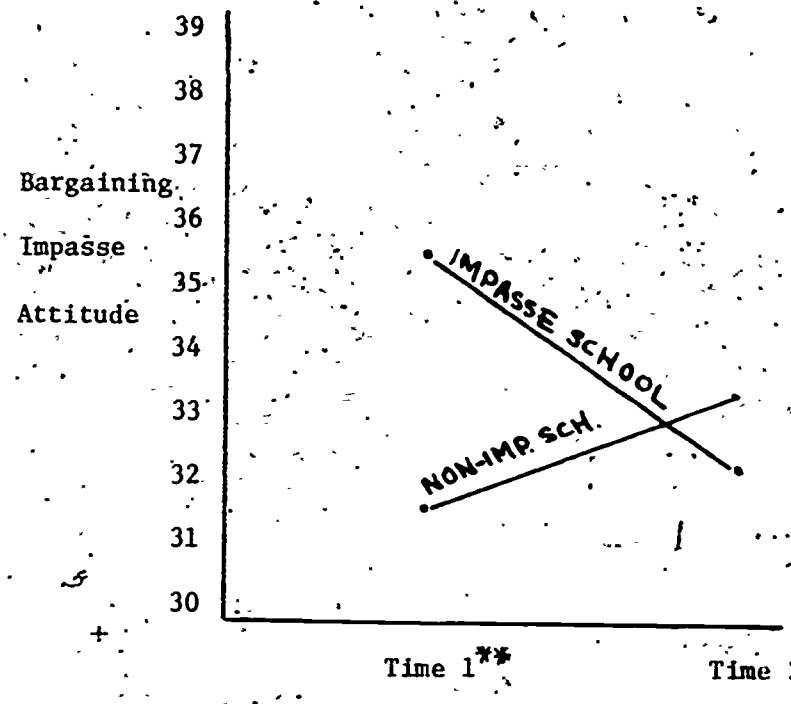
Contrast: Impasse	CB Total	Criteria Bargaining Impasse	Use of Sanctions	Use of Strikes
Impasse school	75.893	33.717	30.464	30.943
Non-impasse school	76.726	32.297	31.365	31.672

Contrast: Time	CB Total	Criteria Bargaining Impasse	Use of Sanctions	Use of Strikes
1972 Impasse time perspective	77.076	34.039	30.890	32.083
1973 Non-impasse time perspective	75.179	32.301	30.652	30.199

Contrast: Impasse x Time	CB Total	Criteria Bargaining Impasse**	Use of Sanctions	Use of Strikes
Impasse school/1972	76.479	35.302	31.032	32.293
Impasse school/1973	75.196	31.828	29.788	29.335
Non-impasse school/1972	78.279	31.492	30.605	31.661
Non-impasse school/1973	75.149	33.114	32.137	31.683

** Significant at the 0.05 level.

Lower score on all variables is a more positive attitude than a higher score.



** t-test significant at the 0.05 level.

Figure 1 Graphic Representation of Impasse by Time Perspective Interaction for Bargaining Impasse Attitude.

2. Students were generally positive in their attitudes toward the process of collective bargaining.

Attitudes of students in an introductory general biology course toward their own learning effectiveness.

1. Their was a significant difference in student attitudes with students who had experienced an extended impasse collective bargaining situation viewing Collective Bargaining and Bargaining Impasse as more important adverse influences on their learning than students who did not experience an impasse. This occurred for both impasse main effect and time perspective main effect, Tables 6, 7, 8, 9.

Attitudes of students in an introductory general biology course toward affective course goals in biology.

1. Students were generally positive in their attitudes toward affective course goals in biology.
2. There was a significant difference in student attitudes toward Fostering Openmindedness and Valuing Logical Reasoning in terms of impasse main effect and time perspective main effect. The students who had experienced an extended impasse collective bargaining situation were less positive in their attitudes than were students who had not experienced impasse, Tables 10, 11, 12, 13, 14.

Correlations of Student Biographic Variables

1. Students who had a negative attitude toward bargaining impasse saw that impasse as an important adverse influence on their learning.

TABLE 6

STUDENT ATTITUDE TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	6.039	3.000	304.000	0.001***

Univariate F-tests

Variable	F(1,306)	Mean Sq.	P less than
Collective Bargaining	13.906	54.199	0.001***
Bargaining Impasse	9.582	40.634	0.002***
Impact Index	1.921	0.167	0.167

*** $p \leq .01$ level

TABLE 7

STUDENT ATTITUDES TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
IMPASSE MAIN EFFECT
MEANS AND STANDARD DEVIATIONS

	Macomb Impasse school N = 215		Oakland Non-impasse school N = 95	
	M	SD	M	SD
Collective Bargaining***	4.493	2.200	5.400	2.116
Bargaining Impasse***	4.088	2.233	4.874	2.213
Impact Index	1.880	0.298	1.830	0.289

*** Significant at the .01 level

A lower score on Collective bargaining and Bargaining Impasse is a more important adverse effect than a higher score.

A higher score on Impact Index reflects a higher impact on learning.

TABLE 8

STUDENT ATTITUDE TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	27.925	3.000	304.000	0.001***

Univariate F-tests

Variable	F(1,306)	Mean Sq.	P less than
Collective Bargaining	67.088	261.471	0.001***
Bargaining Impasse	52.788	223.843	0.001***
Impact Index	2.315	0.201	0.129

*** $p \leq .01$

TABLE 9

STUDENT ATTITUDES TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
TIME PERSPECTIVE MAIN EFFECT
MEANS AND STANDARD DEVIATIONS

Variable	Time 1 Autumn, 1972 N = 152 M	SD	Time 2 Autumn, 1973 N = 158 M	SD
Collective Bargaining***	3.809	2.249	5.696	1.733
Bargaining Impasse***	3.441	2.177	5.184	1.983
Impact Index	1.892	0.297	1.838	0.293

*** Significant at the .01 level.

A lower score on Collective Bargaining and Bargaining Impasse is a more important adverse effect than a higher score.

A higher score on Impact Index reflects a higher impact on learning.

TABLE 10

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	2.511	4.000	362.000	0.042**

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Fostering Openmindedness	8.611	529.035	0.004***
Valuing Logical Reasoning	5.880	291.223	0.016**
Rejection of Myth and Superstition	0.720	77.891	0.397
Appreciation of the Limitations of Science	0.242	25.949	0.623

** $p \leq .05$
*** $p \leq .01$

TABLE 11

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	1.450	4.000	362.000	0.217

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Fostering Openmindedness	4.117	252.926	0.043**
Valuing Logical Reasoning	0.009	0.441	0.925
Rejection of Myth and Superstition	0.368	39.781	0.545
Appreciation of the Limitations of Science	0.175	18.762	0.676

** $p \leq .05$

TABLE 12

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
ADJUSTED MEANS

Estimates adjusted for 2 covariates	Criteria			
	Fostering Openmindedness	Valuing Logical Reasoning	Rejection of Myth and Superstition	Appreciation of Limitations of Science
Contrast: Impasse	***	**		
Impasse school	21.352	19.970	24.034	26.171
Non-impasse school	18.770	18.055	23.044	25.599
Contrast: Time	**			
1972 Impasse time perspective	21.255	19.351	24.007	25.763
1973 Non-impasse time perspective	19.532	19.240	23.325	26.205
Contrast: Impasse x time perspective				
Impasse school/1972	22.318	20.245	24.125	25.564
Impasse school/1973	20.221	19.649	23.928	26.881
Non-impasse school/1972	19.194	17.618	23.779	26.150
Non-impasse school/1973	18.320	18.520	22.262	25.013

** Significant at the .05 level. *** Significant at the .01 level.
A lower score indicates a more positive attitude than does a higher score on all variables.

TABLE 13

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	2.825	6.000	355.000	0.011**

Univariate F-tests

Variable	F(1,360)	Mean Sq.	P less than
Scientific Attitudes	0.137	9.547	0.712
Interaction of Science & Arts	9.614	866.906	0.002***
Science	0.499	31.523	0.480
Scientific Literacy	1.264	98.227	0.262
Methods and Procedures of Science	1.143	92.203	0.286
Science as Basic Part of Modern Living	0.051	3.875	0.822

** $p \leq .05$
*** $p \leq .01$

TABLE 14

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
ADJUSTED MEANS

Estimates adjusted for 2 covariates	Criteria					
	Scientific Attitudes	Interaction Science Arts	Science	Science Literacy	Methods and Procedures Science	Science Part of Modern Living
Contrast: Impasse						
Impasse school	19.356	23.309	18.032	22.692	21.627	18.266
Non-impasse school	19.825	22.591	17.175	20.980	21.128	18.035
Contrast: Time		***				
1972 Impasse time perspective	19.667	24.532	18.024	21.626	21.937	18.286
1973 Non-impasse time perspective	19.352	21.399	17.408	22.631	20.908	18.072
Contrast: Impasse x time perspective						
Impasse school/1972	19.356	24.680	18.202	22.118	21.853	18.434
Impasse school/1973	19.357	21.701	17.834	23.365	21.361	18.068
Non-impasse school/1972	20.285	24.239	17.671	20.649	22.103	17.993
Non-impasse school/1973	19.344	20.863	16.654	21.328	20.105	18.079

*** Significant at the .01 level.
A lower score on the variables indicates a more positive attitude that a higher score.

2. Students who had a positive attitude toward collective bargaining also viewed Fostering Openmindedness as an important course goal.
3. Students who had a positive attitude toward collective bargaining also viewed Valuing Logical Reasoning as an important course goal.
4. Male students were more favorable toward collective bargaining than were female students, Tables 15, 16.

The Factor Analysis Summary.

Six factors were derived from the factor analysis:

Factor I: Attitude Toward Strikes.

Factor II: Attitude Toward Science Goals.

Factor III: General Attitude Toward Collective Bargaining.

Factor IV: Influence of Bargaining Impasse on Learning.

Factor V: Educational Aspirations.

Factor VI: Attitude Toward Use of Sanctions, Table 17.

The Stepwise Regression Summary.

Factor I: Attitude Toward Strikes. Males were more positive in their attitudes toward strikes than females.

Factor II: Attitude Toward Science Goals. Science majors with high grades in biology who had been out of school longer were more positive than non-science majors with lower grades who were recent graduates of high school.

Factor III: General Attitude Toward Collective Bargaining. Males were more positive in their attitudes than females.

Factor IV: Influence of Bargaining Impasse on Learning. Students who had experienced impasse and answered in terms of the time perspective when that impasse occurred

TABLE 15

CORRELATIONS OF THE STUDENT VARIABLES[1]

Variable Name	Var #	Variable number 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Collective Bargaining Total Score	1		22	42	63				17	17										18		
Bargaining Impasse	2			38	36		-18		20	16												
Use of Sanctions in Bargaining	3				48				16													
Use of Strikes by Teachers	4																			17		
Ranking of Collective Bargaining	5						59															
Ranking of Bargaining Impasse	6																					
Impact Index	7																					
Fostering Openmindedness	8									51	19	24	36	26	17	34	23	20	-15			
Valuing Logical Reasoning	9										28	29	38	40	26	38	22	36	-16			-16
Rejection of Myth and Superstition	10											29	17	23	29	29		21	-18			-18
Scientific Attitudes	11												45	60	50	59	33	48			-33	-19
Interaction of Science and the Arts	12													38	40	48	34	34			-23	-19
Science	13														60	63	28	54			-28	-24
Scientific Literacy	14															55	29	46			-28	-23
Methods and Procedures of Science	15																38	49			-25	-20
Appreciation of Limitations Science	16																	29				
Science As Basic Part Modern Living	17																				-26	-20
Years Since High School Graduation	18																					
Sex	19																					14
Science Major	20																					
Recorded Grade in Biology	21																					

N = 300 DF(1,298) 0.148 at the 0.01 level of significance. Source BMD02R

[1] All correlations were multiplied by 100.

TABLE 16

MEANS AND STANDARD DEVIATIONS
STUDENT CRITERION AND BIOGRAPHIC VARIABLES

Variable Name	Mean	Standard Deviations
Years Since High School Graduation	3.20	4.19
Sex	1.44	0.50
Science Major	0.51	0.50
Recorded Grade in Biology	2.23	1.41
Collective Bargaining Total Score	76.91	12.84
Ranking of Collective Bargaining	4.73	2.24
Ranking of Bargaining Impasse	4.28	2.27
Fostering Openmindedness	21.06	8.21
Valuing Logical Reasoning	19.63	7.29
Rejection of Myth and Superstition	23.77	10.17
Bargaining Impasse	33.40	10.80
Scientific Attitudes	19.48	8.72
Interaction of Science and Arts	23.26	10.12
Use of Sanctions in Bargaining	30.83	10.62
Science	17.81	8.09
Scientific Literacy	22.50	9.49
Methods and Procedures of Science	21.57	9.27
Appreciation of the Limitations of Science	26.25	10.06
Science as a Basic Part of Modern Living	18.35	8.82
Use of Strikes by Teachers	31.73	11.30
Impact Index	1.86	0.29

N = 300

Source BMD02R

TABLE 17

STUDENT CRITERION AND BIOGRAPHIC VARIABLES FACTOR ANALYSIS

Var #	Value	Variable Name
		Factor I: Attitude Toward Strikes
21	0.81	-CBQ10[a], Strikes.
25	0.78	-CBQ14, Strikes.
14	0.77	+CBQ3, Strikes.
42	0.73	Collective Bargaining Total Score.
24	0.72	-CBQ14, Strikes.
36	0.71	-CBQ25, Strikes.
58	0.67	Use of Strikes by Teachers.
19	0.53	-CBQ8, Strikes.
38	0.51	-CBQ27, Sanctions.
52	0.41	Use of Sanctions in Bargaining.
22	0.37	-CBQ11, Bargaining
32	0.35	+CBQ21, Sanctions.
49	0.33	Bargaining Impasse.
34	0.32	+CBQ23, Sanctions.
37	0.31	+CBQ26, Strikes.
33	0.30	+CBQ22, Sanctions.
		Factor II: Attitude Toward Science Goals
55	0.79	Methods and Procedures of Science.
53	0.76	Science.
50	0.73	Scientific Attitudes.
54	0.67	Scientific Literacy.
51	0.63	Interaction of Science and the Arts.
57	0.63	Science as a Basic Part of Modern Living.
47	0.52	Valuing Logical Reasoning.
56	0.45	Appreciation of the Limitations of Science.
46	0.43	Fostering Openmindedness.
10	-0.35	Science Major.
11	-0.29	Recorded Grade in Biology.
		Factor III: General Attitude Toward Collective Bargaining
42	0.68	Collective Bargaining Total Score.
26	0.59	-CBQ15, Bargaining.
23	0.51	-CBQ12, Bargaining.
30	0.51	-CBQ19, Bargaining.
16	0.49	+CBQ5, Bargaining.

(Continued on next page)

TABLE 17 (Continued)

Var #	Value	Variable Name
41	0.48	+CBQ30, Bargaining.
28	0.47	-CBQ17, Bargaining
18	0.47	-CBQ7, Bargaining.
12	0.44	+CBQ1, Bargaining.
39	0.40	-CBQ28, Bargaining.
29	0.39	+CBQ18, Bargaining.
17	0.38	+CBQ6, Sanctions.
13	0.36	+CBQ2, Bargaining.
20	0.34	-CBQ9, Bargaining.
22	0.33	-CBQ11, Bargaining.
		Factor IV: Influence of Bargaining Impasse on Learning
45	0.74	Ranking of Bargaining Impasse.
44	0.71	Ranking of Collective Bargaining.
2	0.55	Time Perspective of Response.
		Factor V: Educational Aspirations
9	0.81	Attend a College or University.
8	0.76	Continue Education Beyond the Community College.
		Factor VI: Attitude Toward Use of Sanctions
33	0.61	+CBQ22, Sanctions.
34	0.58	+CBQ23, Sanctions.
32	0.54	+CBQ21, Sanctions.
4	0.33	Years Since High School Graduation.

a -CBQ10: Negative question number ten about collective bargaining in general.

saw impasse as a greater adverse influence on their learning effectiveness than did non-impasse students who answered in terms of a later time perspective.

Factor VI: Attitude Toward Use of Sanctions. Recent male high school graduates were more positive in their attitudes than later graduating females, Tables 18, 19.

SUMMARY AND CONCLUSIONS

Student attitudes toward collective bargaining in general were positive. They were neutral in their attitudes toward sanctions and the use of strikes. The groups differed significantly in their attitudes toward bargaining impasse with students who had experienced that impasse negative in their attitudes and students who had not experienced impasse neutral, Table 20.

These findings conflict with the findings of other researchers. Blendinger[21] found that Michigan high school students did not support strikes as a means of improving education, did not think teachers should violate the law by striking and did not feel that the quality of their education had been improved because of the strike. Swanson[19] found that elementary school children in Los Angeles, California, opposed teacher strikes, with younger elementary school children more opposed than older elementary school children, and girls more opposed to strikes than boys.

In this present study male students were more positive in their attitudes toward collective bargaining than females. This information was derived not only from the correlational analysis but also from the stepwise regression analysis for Factor III:

TABLE 18

PREDICTION OF CRITERION VARIABLES FROM COMBINATIONS OF THE STUDENT BIOGRAPHIC VARIABLES
STEPWISE REGRESSION SUMMARY TABLE

Criterion Variable	Variable Entered	Beta Wt.	Multiple R	Multiple RSQ	F-value to enter
Factor I: Attitude Toward Strikes	Factor V: Ed. Aspirations	0.98	0.59	0.35	160.45
	Sex	0.87	0.63	0.40	25.28
Factor II Attitude Toward Science Goals	Factor V: Ed. Aspirations	-0.55	0.46	0.21	79.66
	Major in Science	-0.45	0.51	0.26	18.94
	Recorded Grade	-0.14	0.53	0.28	10.48
	Years Since HS Graduation	-0.04	0.55	0.30	9.04
Factor III: General Attitude Toward Collective Bargaining	Factor V: Ed. Aspirations	3.66	0.68	0.46	255.36
	Sex	1.74	0.69	0.48	10.40
Factor IV: Influence of Bargaining Impasse on Learning	Time Perspective of Response	1.09	0.58	0.34	153.68
	Impasse or Non-impasse school	0.49	0.63	0.40	28.73
	Factor V: Ed. Aspirations	0.17	0.67	0.45	25.86
Factor VI: Attitude Toward Use of Sanctions	Factor V: Ed Aspirations	1.68	0.66	0.43	227.51
	Years Since HS Graduation	0.12	0.68	0.46	14.10
	Sex	0.86	0.69	0.48	10.65

DF (1,298) 6.63 at 0.01 level of significance.
DF (2,297) 4.61 at 0.01 level of significance.
DF (3,296) 3.78 at 0.01 level of significance.
DF (4,295) 3.32 at 0.01 level of significance.

All values of the variables are significant at 0.01 level.

TABLE 19

MEANS AND STANDARD DEVIATIONS OF STUDENT VARIABLES USED IN THE STEPWISE REGRESSION

Variable Name	Mean	Standard Deviations
Impasse or Non-Impasse School	1.31	0.47
Time Perspective of Response	1.50	0.50
When Completed Return Received	2.17	1.11
Years Since High School Graduation	3.20	4.19
Sex	1.44	0.50
Full-time or Part-time Student	0.75	0.43
Science Major	0.51	0.50
Recorded Grade in Biology	2.23	1.41
Impact Index	1.86	0.29
Factor I	-0.01	1.89
Factor II	0.00	1.27
Factor III	-0.03	6.34
Factor IV	-0.00	0.94
Factor V	-0.00	1.22
Factor VI	-0.01	3.06

TABLE 20

SUMMARY TABLE OF STUDENT ATTITUDES

Variable	Multivariate Alpha Level	Univariate Alpha Level	Univariate Direction
1. Student Attitudes Toward Collective Bargaining	No significant difference.	Impasse Main Effect	
(a) Bargaining Impasse		I x T Interaction 0.05	Non-Impasse Time 1 Students More positive than Impasse, Time 1 Students.
2. Student Attitudes Toward Adverse Influences on Learning Effectiveness.	0.01	Impasse Main Effect	
(a) Collective Bargaining		0.01	Impasse school students see as more important adverse influence than non-impasse students.
(b) Bargaining Impasse		0.01	
3. Student Attitudes Toward Affective Course Goals in Biology	0.05	Impasse Main Effect (Four Goals)	
(a) Fostering Openmindedness		0.01	Non-impasse students more positive than Impasse students
(b) Valuing Logical Reasoning		0.05	
4. Student Attitudes Toward Collective Bargaining	No significant difference.	Time Effect	
5. Student Attitudes Toward Adverse Influences on Learning Effectiveness.	0.01	Time Effect	
(a) Collective Bargaining		0.01	Time 1 Students see as more important adverse influence than do Time 2 Students
(b) Bargaining Impasse		0.01	
6. Student Attitudes Toward Affective Course Goals in Biology.	0.05	Time Effect (Six Goals)	
(a) Fostering Openmindedness		0.05	Time 2 students more positive than Time 1 students
(b) Interaction of Science and the Arts		0.01	

Attitude toward Collective Bargaining. Male students were more positive towards strikes than were female students according to the stepwise regression analysis for Factor I: Attitudes Toward Strikes. Male students were more positive than female students in terms of the use of sanctions according to the stepwise regression analysis for Factor VI: Attitudes Toward Use of Sanctions.

The student correlational data analysis also showed that students who had a less positive attitude toward collective bargaining impasse saw that impasse as an important adverse influence on their learning.

The moderation of student attitudes toward collective bargaining in general could be a function of the age of the students with college freshmen and sophomores exhibiting a more positive attitude than younger students and young children. It could also be a function of the changing climate of the United States in terms of student attitudes toward such adversary processes as those encompassed within the phenomenon of collective bargaining.

There was a significant difference in student attitudes toward collective bargaining and bargaining impasse as important adverse influences on their learning effectiveness. Students who had experienced an extended impasse bargaining situation viewed collective bargaining and bargaining impasse as more important adverse influences than did students who had not experienced an impasse situation. Also, students who answered in terms of the time perspective of response of the impasse semester, Autumn,

1972, saw those same adverse influences as more important than did students who answered in terms of the time perspective of Autumn, 1973, one year after the impasse. This adds emphasis to the findings when one couples this statement with the fact that 28 percent of the Macomb (impasse school) students who answered in terms of how they felt in 1973, one year after the impasse, stated they would respond differently to the opinionnaire if they were to answer in terms of 1972, the impasse semester. Three quarters of these students said they would answer more negatively. An extended impasse collective bargaining situation was seen as an important adverse influence by students in spite of their generally positive attitude toward collective bargaining in general.

There was a significant difference in student attitudes toward affective course goals in biology. Students who had experienced an extended impasse collective bargaining impasse were less positive in their attitudes toward Foster Openmindedness and Valuing Logical Reasoning than were students who had experienced no impasse situation. This is a significant finding of the study. Students were generally positive in their attitudes toward affective course goals in biology yet differed significantly on two important goals. Openmindedness and logical reasoning would appear to be two attributes missing from the actions of faculty, administration and boards of trustees when collective bargaining reaches the impasse situation. Students apparently perceived this and those who experienced an extended impasse were significantly less positive in their attitudes

toward these important goals. The correlational studies show that students who had a positive attitude toward collective bargaining also viewed Fostering Openmindedness and Valuing Logical Reasoning as important course goals. The findings are in contrast with faculty findings. Impasse experiencing students were less positive than non-impasse experiencing students toward affective course goals. The students reacted less positively toward exactly the attributes apparently lacking in an impasse bargaining situation. Once again the time perspective data reinforces the impasse data. Students who answered in terms of the time perspective of the impasse (Autumn, 1972) were less positive in their attitude toward Fostering Openmindedness than were students who answered in terms of the time perspective of 1973, one year after the impasse.

SIGNIFICANCE

The implications of the study concern two important areas: the process of collective bargaining in all its aspects, and the classroom atmosphere under such conditions as bargaining impasse. Teachers view collective bargaining as a positive force to improve their professional working conditions and view even its most extreme form - extended impasse - in a positive sense when they participate in the phenomenon.

The important parameter is the negotiating process itself. The best intentions and the most favorable attitudes do not go far unless accompanied by a knowledge of and a skill in the art of negotiating. Negotiating is an act which requires an understanding

of psychology, economics, and the special characteristics of the institution being represented. It also demands communication skills and a good sense of timing. These skills and understandings are as critical in educational negotiations as they are in industrial bargaining. The better expertise and skill of the bargainers, the more the influence will be toward peaceful negotiations.

Since the strike as a tool of economic bargaining power is going to remain an effective weapon of bargaining faculty, the quality of negotiations becomes an important aspect of the prevention of impasse bargaining situations.

A second important implication is the classroom atmosphere during an impasse situation in collective bargaining. The faculty, administration and board of trustees all need to know that students attitudes can be related to the atmosphere of collective bargaining. Impasse experiencing students were more negative in their attitudes toward openmindedness and logical reasoning than were non-impasse students. The question that needs to be asked is: "How enduring is the change in attitude?" Rokeach[26] relates that all belief-disbelief systems serve two powerful and conflicting sets of motives simultaneously: the need for a cognition framework to know and understand and the need to ward off threatening aspects of reality. He proposes that for most persons in most situations both sets of needs operate together to one degree or another. A person will be open to information <u>insofar as possible</u>, and will reject it, screen it out, or alter it <u>insofar as necessary</u>. How lasting

then is the student attitude toward openmindedness and the valuing of logical reasoning?

Rokeach[27] discusses the relationships among attitude change, expressed opinion change and behavior change. There is an absence of research and theoretical thinking about the effect of attitude change on subsequent behavior. In typical experiments the post-test is given only once, usually within a short time after the experimental treatment; thus the meaning of the expressed opinion change in relation to attitude changes is highly equivocal. The lack of studies showing behavioral changes following an attitude change reinforce the belief that most studies on opinion change do not deal with attitude change, but with superficial opinion change. The moderation through time of the less-positive attitude of students toward the variable Valuing Logical Reasoning tends to confirm this idea. Yet, the Impasse student attitude toward Openmindedness, although moderated by time still remains essentially parallel to the change of the non-impasse students. This would lead one to suspect that at the present time a gap remains (Figure 2, 3).

The question still remains whether more faculty concern about affective course goals during an impasse situation would not moderate the adverse influence of bargaining impasse on such attitudes. The study has shown that aspects of our society (in this case the adversary conditions of collective bargaining) do have an influence on science, at least in terms of attitudes of students toward several important affective goals. Since the impasse is germane to the biology course, why not deal with the situation in class and attempt to show the students how open-mindedness and logical reasoning have or have not been utilized in the bargaining situation?

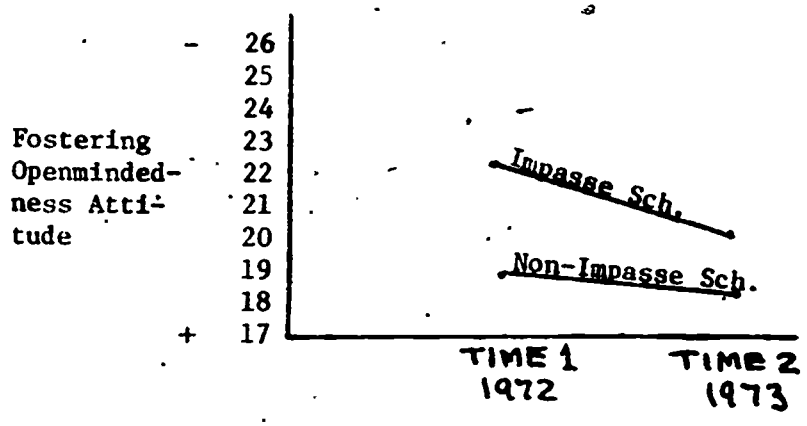


Figure 2 Graphic Representation of Impasse by Time Perspective Interaction for Fostering Openmindedness Attitude.

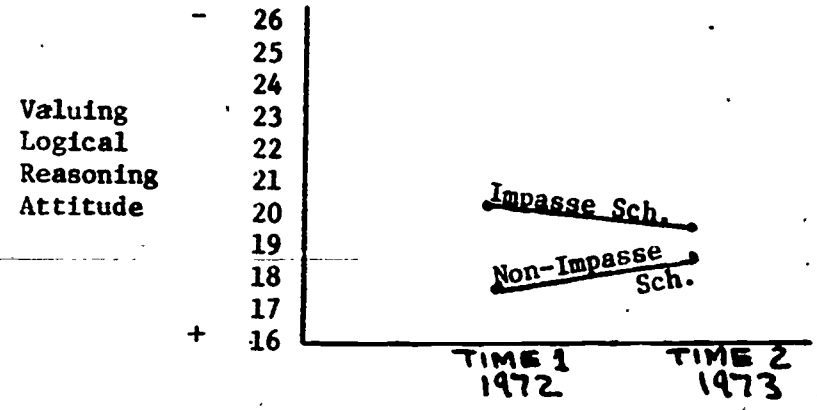


Figure 3 Graphic Representation of Impasse by Time Perspective Interaction for Valuing Logical Reasoning Attitude.

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