

A COMPARISON OF GROUP-ORIENTED INSTRUCTION WITH
INDIVIDUAL-ORIENTED INSTRUCTION
IN GENERAL BUSINESS

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Submitted in partial fulfillment of the requirements
for the Master of Education degree
in the Department of Education
Montana State University
July, 1969

ABSTRACT

The purpose of this investigation is to compare achievement in three ninth grade general business classes in an effort to determine whether the two experimental groups in which the students worked in small groups achieved more than did the control group in which students worked individually.

Residual scores from a standardized pre test and post test were computed for each student. These residual scores were used in the analysis of covariance when English, math, and I.Q. scores were covariates to determine the equality of the groups in the experiment. The adjusted means of the residual scores were compared by means of a t ratio to test for significant difference in achievement.

The null hypothesis that there was no significant difference between the residual test scores of each of the groups when the differences in I.Q., English, and math were statistically equated, was not rejected.

ACKNOWLEDGEMENT

The author would like to express sincere appreciation to Dr. Albert Suvak for his guidance and assistance in the writing of this report.

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CHAPTER I

INTRODUCTION

Grouping in classrooms has been a perplexing problem in the current century. Today, after many studies have been conducted, ambiguity and confusion still exist where group methods of instruction are concerned.

Putting students into small groups in a classroom in an attempt to improve the learning environment for students is not a novel undertaking. Durrell (3:5) states:

Learning teams of pupils are being used extensively to increase the amount and quality of learning in classrooms. Pupil-team learning acknowledges the desire of pupils to work together and utilize the power of mutual aid. Although improved classroom climate, social development, and democratic practice may be outcomes of team learning, the primary concern is for its power to increase the efficiency and effectiveness of classroom learning per hour of instruction.

Vargason (15:32) suggests that past studies on the effectiveness of grouping are inconsistent in their findings, and perhaps inaccurate if not completely amiss in their conclusions. His study was conducted with the purpose of determining the consistency of findings and to attempt to find support for the past investigations conducted by Wilhelms and Westby-Gibson, Wrightstone, and Shane. In general, he found considerable inconsistency in their findings and conclusions. To quote Vargason, "As of today this writer cannot demonstrate that grouping or non-grouping is consistently better."

Vargason's investigation points out a need for further research not only in the general business area, but in all areas where group methods of instruction can be employed.

Educational Digest (13:48) in its article entitled, "Some Tentative Conclusions About Grouping" states:

Research concerning the relative effect of ability grouping on pupil achievement is inconclusive.

Further:

On the basis of available research evidence, therefore, it seems logical to conclude that factors other than grouping procedures must account for differences in achievement gains . . .

The National Education Association, Research Division, (1:75) summarized the research efforts in the area of grouping and concluded:

Research on the relative merits of different organizational procedures for ability grouping as they affect pupils' achievement was extensive. However, the results were inconclusive and indefinite.

It is obvious that further investigations on the matter of grouping are justified.

STATEMENT OF THE PROBLEM

The purpose of this investigation was to compare achievement in three ninth-grade general business classes in an effort to determine whether the two experimental groups, in which the students worked in small groups, achieved more

than did the control group, in which students worked individually.

Placer High School, Auburn, California, general business classes have, in the past, had 30 students or more in each class. Because of the class size and wide differences in ability of students, the use of small groups in the instruction of the class seemed, to the writer, to have been necessary. In large classes, a student who needs assistance may not be helped by the teacher simply because it is physically impossible to work with every student in the time available in each period. The use of small groups would, the writer feels, insure the personal involvement of every student, every day, with classroom activities and provide a better learning environment for all students.

Durrell (3:5) in a statement about slow learners stated, "The independent work of self-directing teams allows the teacher to spend more time providing additional practice and remedial instruction for such pupils."

CHAPTER II

REVIEW OF RELATED LITERATURE

A great many investigations on the subject of grouping have been carried out in the past few years. However, as the foregoing introduction pointed out, little consistency in findings and conclusions have resulted.

Schrank (11:126) states:

To determine whether ability grouping or random grouping is the most effective in producing academic achievement in Mathematics 204, enlisted airmen at the United States Air Force Academy Preparatory School were divided into two equivalent subgroups. Each subgroup was sectioned randomly for one mathematics sequence and according to ability for a second subgroup. Grade averages were compared using the two-tailed t-test. For a standard curriculum, the randomly sectioned group surpassed the ability sectioned group (5 percent level); and for the sequence with differentiation by acceleration, the ability sectioned group surpassed the randomly sectioned group (0.1 percent level). This indicates that it is not so much the method of grouping but rather what is done for a given group that affects achievement.

This investigation points out that the design of an experiment on grouping must be done with a great deal of care to insure that the effect on the group is actually the factor being measured and not the difference in the methods used on each group.

Further corroboration for Schrank's conclusions in the article cited above, appear in the Educational Digest (13:49), ". . . on the basis of the available research evidence, therefore, it seems logical to conclude that factors other than

grouping procedures must account for differences in achievement gains . . ."

Wiest (16:437) conducted a study entitled, "The Relationship Between Individual Proficiency and Team Performance and Efficiency." He attempted to answer three questions:

1. How does the level of performance of a team compare with the performance expected on the basis of a simple additive combination of proficiency of the individuals composing the team?
2. How well can the performance of a group of individuals working cooperatively on a task be predicted from knowledge of the proficiency of individual members of a team?
3. Is team performance better predicted from the more proficient member or the less proficient member?

The population in his experiment consisted of 64 pairs of male undergraduates drawn from psychology courses at the University of California, Berkeley, California, 1961. Wiest's results led to the following conclusions:

1. Team performance is not as good as performance that would be predicted from an additive combination of individual scores.
2. Relatively good prediction can be obtained from knowledge of the proficiency of individual members of the team.
3. The scores of the more proficient members of the team, were slightly more predictive of both team performance and team efficiency.

Some investigators, however, have found that students do in fact learn more when working in groups as opposed to working individually.

Engel (6:56) in his attempt to determine whether students learned difficult concepts better when working in groups than working individually, made the following comment: "Test results showed that my students who learned difficult concepts . . . in small groups, did better than those who learned by conventional methods." Engel's investigation left this writer confused and doubtful concerning the findings and conclusions for the following reasons:

1. Engel did not indicate the number of students who had participated in the study.
2. He did not indicate the city and state in which the study took place.
3. He failed to tell how he measured the achievement of the population used in the study.
4. Terminology such as "conventional methods" was not defined for the reader.

These omissions were, to the writer, significant enough to render the conclusions made on the part of Engel somewhat speculative.

Anderson (2) conducted an experiment in which he compared the effectiveness of two types of leadership interactions, namely, a participatory condition in which the leader would contribute ideas and stimulate the group by any feasible means to achieve maximum performance; and supervisory condition in which the leader was to encourage the group by praising or rejecting ideas, but not under any circumstances contribute ideas of his own to the solution of the problem. The population in this study consisted of 120 men enrolled in a NROTC

Program who were further broken down into 30 four-man groups. The leaders in each group were senior midshipmen enrolled in a leadership course. The group members were freshmen and sophomores. The groups were tested and those in the participatory category were found to produce a high quantity of solutions. Those in the supervisory groups produced a high quality of solutions. The author suggested that this was probably caused by the screening and censoring of the leader in the supervisory groups. According to Anderson (2) in grouping situations one would find a supervisory condition more conducive if quality is valued over quantity.

In reviewing literature the writer found a great many significant and opposing statements concerning grouping:

Ellen (5:200), "No group ever learned anything--only individuals learn."

Scheidel (10:144), on the other hand, seems to suggest that the group does take on some sort of collective entity and does perhaps learn to share to the extent that the group does in fact learn as a group:

Another in the group suggests an extension, a different emphasis, and example, a substitution, et cetera, or perhaps merely expresses his affirmation or rejection of the point. Others volunteer similarly. Thus there is an idea-in-the-making, a preliminary idea changed by the work of the group through oral modification until it represents more or less well their cumulative developing, mutual point of view.

Schrank (11:128), points out that when groups are arranged for the purpose of conducting an investigation, the methods

used with each of the groups is different enough to cause a significant difference in the achievement of the members of the group. Further he suggests that much of the research done with groups up to this time have been, for the most part, "a waste of time and effort."

This implies that much of the research done towards the determination of which treatment is better, ability grouping or random grouping, has not only been inconclusive but generally a waste of time and effort. It seems that many ability grouping versus random grouping studies have actually compared teaching techniques or other factors involved in the given instructional situation rather than the effects of grouping.

Wiseman (17) noted that "peer group instruction" could very well be one of the best ways to teach and to help with the critical teacher shortage in many areas of education.

An article in the Educational Digest (13:47) suggests that groups should be formed in terms of the purposes and needs of the individuals comprising the groups:

Learning gains that result from membership in many different kinds of groups are important. These groups--interest, friendship, committee work, panel discussion, study, etc.--stem from different purposes and needs. Grouping procedures should be determined in light of the purposes to be accomplished.

Durrell (3) as well as many other authors point out that group work does have its place in education, "In the search for ways to improve school instruction, the possibilities of pupil-team learning should be explored."

CHAPTER III

METHODS

Because of the nature of this investigation, the writer felt that statistical experimental research would be more applicable than any other method of research. The same teacher instructed all of the classes in the experiment in an effort to control the variables inherent in the design.

Population in the study

Three ninth-grade general business classes from Placer Union High School, Auburn, California, comprised the population in this experiment. Approximately 30 students were in each class. Altogether, these classes included approximately 100 ninth-grade general business students.

Instruments used for gathering data

Records indicating I.Q. (California Test of Mental Maturity, 1957 Edition administered in 7th grade), academic achievement as measured by 2nd semester final grades in English and mathematics was collected on each student prior to the inception of the experiment. Each student was tested at the beginning of the experiment with the standardized test published by South-Western Publishing Company covering units 1 through 36 of their publication, General Business, by Crabbe Enterline Debrun, 8th Edition. This same general business test was used again as a post test at the conclusion of the experiment.

Experimental group 1, consisting of approximately 30 ninth-grade general business students, received approximately 15 minutes of lecture identical in nature to that received by other classes in the experiment. Lecture having been completed, students were assigned to randomly selected groups of five students. Five students in each group seemed to be desirable since some investigators have found that smaller groups tend to be greatly inhibited in their interaction: O'Dell (8) found that, " . . . dyadic groups were much more reserved in their interaction than larger groups . . ." Each group consisted of 4 randomly assigned students and 1 student supervisor. Anderson (2) pointed out in a study cited earlier that groups working with a supervisor did higher quality work than did groups organized in other ways. This student supervisor was selected on the basis of his I.Q. along with his English and mathematics grades which he had earned in the 2nd semester of the 8th year of his school experience. Table 1 on the next page indicates I.Q., English, and mathematics grades for the supervisors in experimental group 1.

TABLE 1. ABILITY MEASURES FOR SUPERVISORS OF EXPERIMENTAL GROUP I

Student Number	Sex	I.Q.	English	Math
17	F	128	A	A
18	F	127	B	A
23	F	119	B	B
30	F	118	B	B
11	M	114	A	B
21	F	115	B	B
26	F	114	B	B

Table 2 below indicates I.Q., English, and mathematics grades for the supervisors in experimental group III.

TABLE 2. ABILITY MEASURES FOR SUPERVISORS OF EXPERIMENTAL GROUP III

Student Number	Sex	I.Q.	English	Math
83	F	118	B	B
92	M	117	B	B
80	F	134	A	A
85	F	113	C	B
73	F	113	C	B

Experimental group number III had three bilingual students who were put into a special group and were not used for the purpose of this experiment. Background statistics such as 8th grade scores were unavailable since they had not been in this country for more than a couple of months. These students' numbers were 74, 76, and 91. (See appendix for further information.)

The supervisors listed in the tables above were assigned to a group by means of a tossed coin. It was the supervisor's responsibility to see that all assigned projects were completed in each group, including his own. Supervisors assisted by contributing ideas and censoring or rejecting ideas of the group as an encouragement towards quality and quantity work. The student supervisor worked closely with the instructor by means of bi-weekly conferences during the last 10 minutes of the period. The instructor did not work individually with a student during the course of the experiment. Each student received a sheet on which the major concepts to be learned from each unit were outlined. These materials were identical to those distributed in the other classes in the experiment. Upon completion of the units assigned, the experimental class 1 was again given the standardized test published by South-Western Publishing Company for the text, General Business, which was used as the pre test in all classes at the beginning of the experiment. This post test was used to measure the achievement of the classes over the material covered during the course of the experiment. Control class 2, was identical in nature to experimental class 1 with the following exceptions: No groups

were formed at the conclusion of the 15-minute lecture and the instructor worked individually with students as much as possible.

Experimental class 3, with the following exception was identical to Experimental class 1: The instructor actively participated with the groups in an effort to improve the learning environment.

Hypothesis to be tested

1. There is no significant difference between the residual test scores of each of the groups when the English grade was statistically equated.
2. There is no significant difference between the residual test scores of each the groups when the I.Q. is statistically equated.
3. There is no significant difference between the residual test scores of each of the groups when the mathematics score was statistically equated.

Treatment of the data

The data indicating I.Q. (CTMM, 1957 edition) and academic achievement as measured by the final grades given in the 8th grade in the areas of English and mathematics, along with residual scores from the pre test and post test scores was subjected the the statistical method analysis of covariance in an effort to equate the classes in the experiment and to find if a significant difference exists in achievement. A residual score was computed for each student. The residual score was the difference between the score earned on the pre test and the score earned on the post test. All following statistics used in this experiment were computed with residual scores. The mean residual scores computed from the post tests of the

experimental and control classes were compared by means of a t ratio to determine whether a significant difference in achievement exists. A one-tailed test with a confidence level of .01 percent was used to determine significance in this experiment. In the example cited below, Downie (4:126) assisted the writer in the treatment of the data in this experiment:

We have two groups: The control group, which taught by one of the conventional reading methods and the experimental group, which is taught by the new method. We have reasons to feel, on the basis of previous work with our method, that the experimental group should score higher on the reading test which they are given at the end of the semester. Our null hypothesis this time is that the experimental group has a mean achievement score which is equal to or less than that of the control group. If this hypothesis can be rejected, then it follows that we can make a probability statement about the alternative hypothesis, that the mean achievement score of the experimental group is higher than that of the control group.

CHAPTER IV

RESULTS

In order to test the hypothesis stated in chapter III, the analysis of co-variance and adjusted means were computed between the residual scores when mathematics, English, and I.Q., were covariates. Table III below presents the adjusted means, standard deviations and F test variable results computed for the residual scores for each of the groups when I.Q. is a covariate:

TABLE III

ADJUSTED MEANS, STANDARD DEVIATIONS AND F TEST VARIABLE RESULTS
COMPUTED FOR THE RESIDUAL SCORES FOR EACH OF THE GROUPS WHEN
I.Q. IS A COVARIATE

GROUP	N	ADJUSTED MEAN	STANDARD DEVIATION
Group I	35	14.91	1.18
Group II	29	15.89	1.29
Group III	28	12.04	1.32

F = 3.0897 with 2 and 88 degrees of freedom

The null hypothesis that there is no significant difference between the residual test scores of each of the groups when the difference in I.Q. was statistically equated was not rejected.

The null hypothesis that there is no significant difference between the residual test scores of each of the groups when the difference in math scores was statistically equated, was not rejected. Table IV on the next page presents the adjusted means standard deviations and F test variable results computed for the

residual scores for each of the groups when math is a covariate:

TABLE IV

ADJUSTED MEANS, STANDARD DEVIATIONS AND F TEST VARIABLE RESULTS
COMPUTED FOR THE RESIDUAL SCORES FOR EACH OF THE GROUPS WHEN
MATH IS A COVARIATE

GROUP	N	ADJUSTED MEAN	STANDARD DEVIATION
Group I	35	15.33	1.12
Group II	29	15.68	1.23
Group III	28	11.75	1.26

F = 2.3100 with 2 and 88 degrees of freedom

Table V below presents the adjusted means standard deviations and F test variable results computed for the residual scores for each of the groups when English is a covariate:

TABLE V

ADJUSTED MEANS, STANDARD DEVIATIONS AND F TEST VARIABLE RESULTS
COMPUTED FOR THE RESIDUAL SCORES FOR EACH OF THE GROUPS WHEN
ENGLISH IS A COVARIATE

GROUP	N	ADJUSTED MEAN	STANDARD DEVIATION
Group I	35	15.23	1.14
Group II	29	15.87	1.23
Group III	28	11.67	1.28

F = 3.2117 with 2 and 88 degrees of freedom

The null hypothesis that there is no significant difference between the residual test scores of each of the groups when the difference in English scores was statistically equated, was not rejected.

CHAPTER V

SUMMARY

Using small groups in a classroom situation in an attempt to improve the teaching and learning environment for students is indeed a method which is surrounded by much controversy. Many writers in this area have pointed to the inconsistency in results of experiments where group methods are used.

Placer High School, Auburn, California, like other educational institutions has experienced the need for newer and better methods of teaching subject matter. In an effort to find a better method or methods, this writer conducted an investigation to determine whether students learned more when working in small groups than did students in the traditional class in which lecture and individual effort was the methodology used.

The population used in this investigation consisted of one hundred freshmen students from Placer High School, Auburn, California. These one hundred students were all taking general business during the 1966-67 school year, and comprised three separate general business classes. By tossing a coin, one class was selected as a control class and the other two were designated experimental classes. The same teacher taught each class throughout the experiment, and each class received a different method of teaching as described in Chapter III.

Data were collected from 8th grade records. These data consisted of an I.Q. score measured by the California Test of Mental Maturity, 1957 edition, which was administered to these students in the 7th grade. Their second semester final grades in English and mathematics earned during their eighth grade of school, along with scores which were obtained from a standardized test (Units 1 through 36, General Business, by Crabbe Enterline DeBrun, 8th edition, South-Western Publishing Company) which was administered at the beginning of the experiment as a pre test. This same test was again administered to all students in the experiment at the conclusion of the experiment. The residual scores which were the difference between the pre test and post test scores were used to compute all the statistical comparisons. English, mathematics, and I.Q. scores were used as covariates and were subjected to the statistical treatment of analysis of covariance in an attempt to equate the groups used in the study. Adjusted means of the residual scores of each group were compared for significant differences.

This writer hypothesized that:

1. There is no significant difference between the residual test scores of each of the groups when the English grade was statistically equated.
2. There is no significant difference between the residual test scores of each of the groups when the I.Q. is statistically equated.
3. There is no significant difference between the residual test scores of each of the groups when

the mathematics score was statistically equated.

Based on the results of the foregoing investigation, this writer concluded:

1. The null hypothesis that there is no significant difference between the residual scores of each of the groups when the difference in I.Q. was statistically equated, was not rejected.
2. The null hypothesis that there is no significant difference between the residual scores of each of the groups when the difference in English scores was statistically equated, was not rejected.
3. The null hypothesis that there is no significant difference between the residual scores of each of the groups when the difference in math scores was statistically equated, was not rejected.

The methods used in this experiment did not result in a significant difference in achievement in any of the three groups when residual scores were used as a measure of achievement.

Recommendations

This writer would like to make the following recommendations for further study:

1. A replicate study done in a different locality. A study of this type would, hopefully, lend itself to making this writer's study more universally applicable.
2. A particularly interesting area to be explored might be in the area of pupil interest. Since many "dropout" students appear to leave school prematurely because of lack of interest, a similar study in which interest levels are measured before and after the grouping experience might yield some interesting information.
3. Finally, a duplication study would certainly be justified in light of the great number of inconsistencies in findings and conclusions of group studies.

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APPENDIX

RAW DATA ON
EXPERIMENTAL AND CONTROL GROUPS

RAW DATA
EXPERIMENTAL GROUP 1

SEX	Student Number	I.Q.	English Grade *	Math Grade *	Pre Test Score	Post Test Score	Residual Score
F	1	98	1	3	28	38	10
M	2	94	1	3	25	35	10
F	3	110	2	3	27	43	16
F	4	112	2	2	28	53	25
F	5	98	4	4	33	46	13
F	6	86	4	4		30	
F	7	101	3	3	27	45	18
M	8	109	2	2	38	55	17
M	9	96	3	4	20	21	1
M	10	109	3	2	26	56	30
M	11	114	2	1	32	50	18
M	12	112	2	2	25	51	26
F	13	111	2	3	28	51	23
F	14	104	3	3	32	41	9
F	15	101	3	3	27	45	18
F	16	104	3	3	31	40	9
F	17	128	1	1	35	60	25
F	18	124	1	2	45	59	14
F	19	102	3	3	32	45	13
M	20	108	3	3	30	45	15
F	21	115	2	2	33	48	15
M	22	112	2	2	40	54	14
F	23	119	2	2	38	51	13
M	24	84	4	4	21	28	7
M	25	106	3	4	29	46	17
F	26	114	2	2	26	49	23
F	27	89	4	4	30	38	8
F	28	107	3	3	31	46	15
F	29	109	2	2	26	49	19
F	30	118	2	2	31	58	17
M	31	108	3	2	27	53	26
M	32	104	3	3	40	51	11
F	33	97	3	3	36	43	7
F	34	104	3	3	26	42	16
F	35	111	2	3	28	49	21

* 1=A, 2=B, 3=C, 4=D

RAW DATA
EXPERIMENTAL GROUP 2

Sex	Student Number	I. Q.	English Grade *	Math Grade *	Pre Test Score	Post Test Score	Residual Score
F	36	94	3	3	26	48	22
F	37	109	2	2	29	45	16
F	38	105	2	3	32	48	26
F	39	83	3	4	21	31	10
F	40	93	2	2	33	41	8
F	41	97	3	3	34	50	16
F	42	120	2	2	31	55	24
F	43	109	2	2	32	55	23
F	44	91	3	3	40	50	10
F	45	112	2	2	32	52	20
F	46	118	2	2	31	53	22
F	47	80	4	4	21	21	0
F	48	74	4	4	18	25	7
F	49	111	3	3	25	44	19
F	50	113	2	3	31	57	26
F	51	110	3	3	30	43	13
F	52	112	2	3	30	45	15
F	53	122	2	1	37	49	12
F	54	90	4	3	31	43	12
F	55	89	3	4	18	34	16
F	56	109	2	3	29	39	10
F	57	91	3	3	19	43	24
F	58	71	4	4	28	39	11
F	59	107	1	1	38	54	16
F	60	100	3	3	26	40	14
F	61	125	1	1	32	60	28
M	62	113	2	1	35	58	23
F	63	115	2	2	27	37	10
F	64	106	3	3	30	39	9

* 1 = A, 2 = B, 3 = C, 4 = D

RAW DATA
EXPERIMENTAL GROUP 3

Sex	Student Number	I.G.	English Grade *	Math Grade *	Pre Test Score	Post Score	Residual Score
F	65	98	3	3	34	56	22
M	66	78	3	3	24	35	16
F	67	86	3	3	25	43	18
F	68	104	4	4	31	45	14
F	69	72	4	4	19	21	2
F	70	105	4	3	25	37	12
M	71	100	3	4	32	39	7
F	72	94	2	3	30	49	19
F	73	113	2	3	37	55	18
M	74	84			18	23	5
F	75	113	3	3	33	43	10
M	76				17	33	16
F	77	111	3	3	35	31	-4
M	78	108	3	3	33	56	23
F	79	111	1	2	35	52	17
F	80	134	1	1	50	59	9
F	81	92	4	4	17	10	-7
M	82	105	3	3	34	44	10
F	83	118	2	2	39	44	5
F	84	97	3	4	30	35	5
F	85	113	2	3	38	55	17
F	86	90	3	3	20	35	15
F	87	101	4	4	25	41	16
M	88	97	3	3	31	43	12
F	89	93	3	3	21	40	19
F	90	106	3	3	30	44	14
F	91	77	4	4	20	17	-3
F	92	117	2	2	36	48	12

* 1 = A, 2 = B, 3 = C, 4 = D