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Lecture Versus Discussion in the Study of Sophomore Library Skills

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LECTURE VERSUS DISCUSSION IN THE STUDY
OF SOPHOMORE LIBRARY SKILLS

A Research Paper
Presented to the
Faculty of the Library Science Department

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts

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INTRODUCTION

All educators must ask themselves what methods and techniques will provide the best possible atmosphere for learning in the classroom. They must also consider which will best promote individual and group learning within the classroom. Couch said,

Learning is an individual process. Students learn in spite of what the teacher does. But it is assumed that all students ultimately learn most under the supervision of a teacher who performs as a resourceful, creative, and energetic guide.¹

Our society is committed to the goal of mass education which is achieved most economically through the lecture method, because more students can then be reached by one instructor. Students, however, enjoy individual contact with the faculty; and they generally agree that a basic one-to-one (teacher-to-pupil) relationship is the best. In most schools of today, however, the most common pupil-to-teacher relationship is generally found to be approximately twenty-five-to-one.

Although many techniques of teaching have been developed and utilized, the two methods that have been most frequently used and discussed are the lecture and the

¹Richard Couch, "Is Lecturing Really Necessary?" The American Biology Teacher, October 1973, p. 391.

discussion. Through the years numerous research studies have been undertaken in this area. Not only has lecture versus discussion been researched, but research has also been done on lecture versus other techniques; such as, individualized instruction and programmed instruction.

In a chapter entitled "The Role of Evaluation in Teaching and Learning," Paul L. Dressel made the following comments in relation to teaching methods:

One of the difficulties in improving the learning process is that too much attention has been focused on the teacher and too little on the student. Teaching is only a means to an end, the education of students in respect to objectives which hopefully are understood and accepted by both teacher and students. . . .

In addition to these variations, there are still other factors which help to determine the condition of learning. Failure to pay adequate attention to any of them will diminish both the quality and quantity of learning. Among these are the objectives of a course; the course content; the textbook and other materials used in the course; the instructional methods used by the teacher; . . .²

Problem and Hypothesis

The purpose of this study was to determine which method of instruction--the lecture or the small group discussion--would achieve the best learning results as far as knowledge of certain unfamiliar materials was concerned.

Specifically, the author of this research study tried to answer this question: When an instructor is

²Harry D. Berg, ed., Evaluation in Social Studies, Vol. 35, Yearbook of the National Council for the Social Studies (Washington, D. C.: National Council for the Social Studies, 1965), pp. 1-2.

teaching "selected" reference books to average-ability sophomores in an English 10 library skills unit at Fort Dodge Senior High School, Fort Dodge, Iowa, which method of instruction--the lecture or the small group discussion--will achieve the best learning results as measured by an author-constructed post-test?

In this research study the author predicted a null hypothesis: no significant difference in student learning achievement as measured by an author-constructed post-test in English 10 library skills unit of "selected" reference books will be found between the lecture and the small group discussion methods of teaching.

Assumptions

Before embarking on this research study, the author made some assumptions. First, the teacher can present both the lecture and the small group discussion techniques without bias. In other words, he does not slant the treatment of the study by giving the lecture in a monotone voice. Furthermore, the teacher does not help one discussion group more than he does another; he does not neglect one group nor does he favor one. Second, the techniques of both the lecture and the small group discussion are applicable at the tenth-grade level. By their sophomore year these students have frequently been exposed to both the lecture and the small group discussion methods. In social studies classes students learn through small group discussions and through

lectures. Third, although these students have been exposed to some reference books previously and they have already had some study of library skills, they have had no in-depth study of these "selected" reference books. In fact, many of these "selected" reference books are not available in the junior high libraries in Fort Dodge; therefore, these sophomores have had no previous contact with them. Finally, tenth-grade students have the necessary educational background to make the study meaningful. This would include the ability to take notes. After having taught sophomores for awhile, a teacher knows their abilities, one of which is note-taking.

Limitations

There were several limitations to this research study. Some external variables (such as, level of maturity and amount of information that a student brings to this situation) could not be controlled in this study. Neither could the author control the intelligence of the students. Some control could be exercised over the ability of the students because they are average-ability. In other words, there are no high-level or most-creative students nor are there any low-level or potential drop-out students. No broad generalizations would be possible because the population was limited to average-ability sophomore students at the Fort Dodge Senior High School, Fort Dodge, Iowa. The population was determined by ability (according to some

tests³) and by scheduling. A final limitation is that only "selected" reference books were used in this study.

Definitions

Since each research study has specific definitions for its terms, the following are the definitions of certain terms in this research study.

Lecture. Stovall defines lecture as a

more or less continuous oral presentation of information and ideas by the teacher with little or no active participation by the members of the class.

After, or perhaps during, the lecture students may ask questions in order to clarify some information.

Small group. According to Bormann, small group is "an identifiable social entity"⁵ which is composed of at least three people. In a group of five, all of the people speak. In a group of seven, the quiet ones do not talk.

Discussion. Ruja defines discussion as the

interchange of question and answer [sic] among students primarily with the instructor playing a role . . . of moderator. The instructor roughly defines the area of discussion and supplies information when directly asked for it or when it

³See definition, p. 6.

⁴Thomas F. Stovall, "Classroom Methods" II. Lecture Vs. Discussion," Phi Delta Kappan, 39: 255, March 1958.

⁵Ernest G. Bormann, Discussion and Group Methods: Theory and Practice (New York: Harper & Row, Publishers, 1969), p. 3.

illustrates a point already made or . . . poses a question relevant to the topic under consideration.

Average ability. Students of average ability at Fort Dodge Senior High School, Fort Dodge, Iowa, are determined by their scores on the Iowa Tests of Educational Development, by their scores on the Differentiated Aptitude Test, and by the recommendations of their teachers. Any student with a composite score between the forty to seventy centile on the Iowa Tests of Educational Development is subject to the average-ability group. In a half-hour summer counseling session, the student and his parents talk with his counselor to determine his ability grouping. Occasionally, a student with a lower or a higher than average score is admitted to this group because of this counseling session.

Reference books. Reference books selected for this study included the following: Webster's Biographical Dictionary; Dictionary of American Biography; Contemporary Authors; Who Was Who in America; Who's Who in America; Roget's Thesaurus; Post's Etiquette; Statistical Abstract of the United States (American Almanac); Granger's Index to Poetry; Short Story Index; Play Index; New Cassell's French Dictionary; Larousse Modern French-English Dictionary; Hammond Ambassador World Atlas; Rand McNally New Cosmopolitan World Atlas; World Almanac; Who's Who; Current

⁶Stovall, op. cit., p. 256.

Biography; Twentieth Century Authors; Robert's Rules of Order; American Book of Days; Bartlett's Familiar Quotations; Information Please Almanac; Readers' Encyclopedia; Harper's Topical Concordance; Statesman's Yearbook; Webster's Geographical Dictionary; Iowa Official Register; Stevenson's Home Book of Quotations; Law Dictionary of Practical Definitions by Edward J. Bander; European Authors 1000-1900; British Authors of the Nineteenth Century; Webster's Dictionary of Synonyms; Allen's Synonyms and Antonyms. They did not include English language dictionaries, encyclopedias, the Pamphlet File, or the Readers' Guide to Periodical Literature.

Learning achievement. Learning achievement is the acquisition of information.

Significance of the Study

Although many research studies have been conducted about this topic, most of them involved college students. Many of them were also undertaken in the early twentieth century. Since at that time college students were screened closely before admission, the population of prior studies involved serious older students.

As far as the author could find, only one research study has been done in the library skills area. Of course, this is only logical since college students are supposed to know the necessary library skills. Therefore, the author feels that this research study will be quite beneficial to

her in determining which method of instruction--the lecture or the small group discussion--will produce the best learning results in a library skills unit for sophomores in high school. After reading this research study, future researchers may be encouraged to experiment with teaching methods in relation to library skills.

REVIEW OF RELATED LITERATURE

In reviewing the literature, the author discovered that there ^{were} are numerous research studies involving the lecture method of teaching versus other methods of teaching. Since many of these studies did not directly apply to this study, the author limited the review of related literature to only those studies that contain the lecture method versus the discussion method. (The author also reviewed many articles that discussed the pro's and con's of the lecture and the discussion methods, but these are included later in this literature review.)

In many research studies comparing the lecture and the discussion method in college-level classes, no significant difference was obtained in the mastery of factual

information. Bane (1924),⁷ Alderman (1922),⁸ and Gerberich and Warner (1936)⁹ found these results to be true.

In the Introductory Psychology course at Michigan State University, Eglash¹⁰ conducted a study to determine the students' achievement and the students' reactions in a group-discussion class as compared to those in a lecture class. In the lecture section, materials from the class discussion section were presented as a lecture. Quizzes were administered after the lectures and the discussions. Eglash found that the method of teaching did not affect the students' achievement on the type of examinations currently used in the course. He also found that the morale of the lecture class was significantly higher than that of the group-discussion class.

Eglash's study is the one research study that the author found which most closely resembles her study. The

⁷Thomas F. Stovall, "Classroom Methods: II. Lecture Vs. Discussion," Phi Delta Kappan, 39: 256, March 1958.

⁸Clyde Wallace Gwinn, An Experimental Study of College Classroom Teaching: The Question-and-Answer Method Versus the Lecture Method of Teaching College English (Nashville, Tennessee: George Peabody College for Teachers, 1930), p. 3.

⁹J. R. Gerberich and K. O. Warner, "Relative Instructional Efficiencies of the Lecture and Discussion Methods in a University Course in American National Government," Journal of Educational Research, 29: 576, April 1936.

¹⁰Albert Eglash, "A Group-Discussion Method of Teaching Psychology," Journal of Educational Psychology, 45: 257-263, May 1954.

population was not randomly sampled but schedule-oriented. If the students could fit this class into their schedules, they became the population. The discussion section was conducted in a similar manner to that of this author. Perhaps the most observable difference was the lecture section in which Eglash's students also saw movies.

Rohrer¹¹ obtained the same results in a study conducted in a beginning college course of American Government. Three instructors taught four sections. Each had a lecture and a discussion section. All materials were the same for every section. Students were not assigned to sections through a random-sampling procedure, but their enrollment in this class depended on their ability to fit it into their schedule of classes. Objective tests were administered at the beginning and the end of the semester for both the lecture and the discussion sections. "No statistically significant differences were observed between the small classes taught by the lecture or discussion methods, . . ." ¹² Rohrer had no control over the population of his study, a problem which this author also had.

¹¹John H. Rohrer, "Large and Small Sections in College Classes," Journal of Higher Education, 28: 275-277, May 1957.

¹²Ibid., p. 279.

Studies by Spence (1928),¹³ Remmers (1933),¹⁴ Ruja (1954),¹⁵ and Stovall (1958)¹⁶ found slight but nonsignificant differences favoring learning in classes conducted by the lecture method as opposed to the discussion method.

In 1951 Husband¹⁷ compared the large lecture and the smaller discussion methods of teaching General Psychology to seventeen hundred Iowa State College undergraduates, mostly sophomores. During the six quarters in which the study was conducted, the lecture classes scored nonsignificantly higher in five out of the six quarters. No control was involved in the selection of the population in this study either.

When Gwinn¹⁸ studied the achievement of sophomores and above in college English 232, he found that the "mean point gain for the question-and-answer section of the whole group is 35.24 and the mean point gain for the lecture section of the whole group is 36.02."¹⁹ These results could be affected by the fact that one teacher was responsible for teaching both sections, using the lecture method in one and

¹³N. L. Gage, ed., Handbook of Research on Teaching (Chicago: Rand McNally & Company, 1963), p. 1126.

¹⁴Ibid. ¹⁵Ibid. ¹⁶Ibid., p. 427.

¹⁷Richard Wellington Husband, "A Statistical Comparison of the Efficacy of Large Lecture Versus Smaller Recitation Sections Upon Achievement in General Psychology," Journal of Psychology, 31: 298-299, April 1951.

¹⁸Gwinn, op. cit., p. 39. ¹⁹Ibid., p. 71.

the question-and-answer method in the other.

A few research studies have obtained results that show the significant superiority of the discussion method. In 1925 Bane found a significant superiority for the discussion method when he measured achievement of delayed recall.²⁰ Later both Bane (1931) and Rickard (1946) used delayed testing procedures and found that knowledge acquired by the discussion method of teaching was retained significantly better than that in the lecture method without discussion.²¹

After reviewing the preceding research studies, the author found that in the mastery of factual information no significant difference can be found between the lecture or the discussion method of teaching. The author, however, found two exceptions in her research. (1) When the sections were taught by various instructors, a slight difference was found; no significant difference was found when all sections were taught by one instructor. (2) In a few studies the discussion method was found to be significantly superior when the researchers measured achievement of delayed recall; no significant difference was found when researchers measured achievement of immediate recall. Nevertheless, when all variables are constant, no significant mean difference

²⁰Gage, op. cit., p. 1126.

²¹Stovall, op. cit., p. 256.

in the mastery of factual information can be found between the lecture or the discussion method of teaching.

The author also reviewed many articles that discussed the pro's and con's of the lecture and the discussion methods. Certain instructors and students prefer one method over the other for various reasons.

Thomas²² argued that since lectures are boring and take longer to be taught than the written word, lectures could be written into book form for the students to read. If one enlivens the lectures with anecdotes, the students remember only the jokes.

On the other hand, Kyle²³ blamed the lecturers for the lecture method. A good lecturer has prepared emotionally for the lecture; he has put his emotions and his feelings into it. Davis²⁴ agreed with Kyle and gave two principles of master lecturers: (1) simplicity of lecture plan and (2) abundant use of examples.

Discussion often results in the relating of personal

²²Norman F. Thomas, "The Lecture Is Obsolete," Improving College and University Teaching, 16: 4-5, Winter 1968.

²³Bruce Kyle, "In Defense of the Lecture," Improving College and University Teaching, 20: 325, Autumn 1972.

²⁴Robert J. Davis, "Secrets of Master Lecturers," Improving College and University Teaching, 13: 150-151, Summer 1965.

experiences, according to Marshall.²⁵ Unless they are very teacher-oriented, the discussions do not accomplish their purpose.

Bailey²⁶ advocates that teachers must prepare for the discussion. First, they must develop a plan that can result in sound learnings from the discussion. Then, they should use the selected set of guidelines during the discussion. Finally, they must evaluate the discussion experience.

Naal believes that

classroom discussion works best when: (1) it occurs in small groups; (2) it is a spontaneous sharing of new knowledge; (3) it is a springboard, arousing interest in new topics; and (4) students are trained to discuss and to listen.²⁷

Therefore, no definite conclusions can be drawn, concerning the pro's and con's of either the lecture or the discussion method.

As a result of the review of related literature, this author found that in the acquisition of information there is significantly no difference between the lecture or the discussion method of teaching. If other areas are

²⁵Max S. Marshall, "Discussing Discussions," Peabody Journal of Education, 47:259-264, March 1970.

²⁶Lena Bailey, "How to Make Classroom Discussions Work," Forecast for Home Economics, 18: F-13, March 1973.

²⁷Urban Naal, "How Effective Is Classroom Discussion?" Catholic School Journal, 68: 24-25, May 1968.

measured, some slight significant difference may be found. Sometimes other factors (such as, attitude or ability) may bias the study. Nevertheless, if all variables are constant, neither the lecture nor the discussion method of teaching would produce a significant mean difference in the acquisition of information.

METHODOLOGY

This research study was conducted with Mrs. William Gorman as the instructor at the beginning of the fall semester in the school year of 1975-1976. The population was two sections of average-ability sophomores in the instructor's English 10 course at Fort Dodge Senior High School, Fort Dodge, Iowa. No attempt was made to sample the students; they were the population because of their class schedules. The third-hour section was designated as the lecture section; the fourth-hour was designated as the small group discussion section. The fourth-hour was split because of lunch. There were approximately forty-five minutes of class before lunch and fourteen minutes after lunch. Each section contained twenty-eight students; but because of absenteeism from school, only twenty-six in each section were included in this research study.

During the teacher workshop (August 19, 1975, to August 22, 1975), before school each day and sometimes after school, the author instructed Mrs. Gorman about the content of the study. Before and during the actual study, the

author outlined the content to be presented. The material that was presented preceding the actual study was taught by a combination of the lecture and of the whole class as a discussion group. Various media²⁸ were used at that time.

From the beginning of the school year right on throughout the research study, regular classroom procedures were followed as closely as possible. Every day students received a new vocabulary word. After two weeks the students were then tested, usually on Friday, over those ten words. On every Wednesday students engaged in values clarification. On September 17, 1975, students were assigned a project concerning the Readers' Guide to Periodical Literature. Correct bibliographic entry form was also discussed.

From August 25 through September 11 under the direction of Mrs. Gorman, the students in both sections studied other library skills: the card catalog, Readers' Guide to Periodical Literature, encyclopedias, Pamphlet File, Dewey Decimal Classification System, audio-visual materials, and the parts of a book. They were introduced to the IMC by selected slides prepared by the librarian and the media specialist of the Fort Dodge Senior High School. During the showing of the slides, the instructor commented on location of the materials and explained various rules and procedures in the IMC. After this presentation, the students

²⁸See Appendix C, p. 40.

went on a brief tour of the IMC, met the librarian and the media specialist, and roamed around the IMC for a few minutes in order to become acquainted with the facilities. During the first two weeks of school, the IMC was open only for classes and students with teacher-passes. Because there are two junior high schools in Fort Dodge, some of these students may have had some contact with some of these reference books. Both schools have libraries and offer a library skills unit, but students have not used the Senior High IMC nor have they used these "selected" reference books. After the two sections had reviewed the aforementioned library skills and visited the IMC, every student took the pre-test for reference books.²⁹ Then, one section was taught strictly by lecture; the other was taught strictly by small group discussion.

In the lecture section after the instructor had listed the names of the books to be presented that day on the chalkboard, she presented information about the reference books to the class. She stressed content, purpose, arrangement, special features, bibliography, and index. The students were expected to take adequate notes from the lecture, since they had no further access to the reference books. No students were forced to take notes or to listen, but an experienced teacher can observe both activities as he

²⁹See Appendix A, pp. 32-36.

is lecturing. Furthermore, a listening unit in speech classes and a study skills unit in library units are taught in the junior high schools of Fort Dodge. As she was lecturing, the instructor showed the class the books; however, the students did not handle the books. During and after the lecture, students might ask questions in order to clarify any information and to add to any notes that they had taken to use in studying for the test.

Approximately fifteen minutes before the end of the period each day, students received a list of teacher-prepared questions that could be answered by using one of the reference books discussed during that day's lecture. They decided which book to use for each question, wrote down the name of the correct reference book, and handed in the questions and answers before leaving class.

The other section was taught strictly by small group discussion. After students had been numbered off into groups of five people, each group chose a leader who kept the discussion going. (Four groups had five people; one group had six.) In their groups, the students handled the same reference books that were discussed in the lecture section on that day. Each group decided what the content of the book ^{was} is, what the purpose of the book ^{was} is, and which questions the book ^{would} will answer. During this discussion each group constructed a series of questions which could be answered by using the appropriate reference book. While these small group discussions were in session, the instructor

moved from group to group, answering any questions that arose.

About fifteen minutes before the end of the period each day, the students exchanged their lists of questions. Then, they wrote down the names of the reference books to correctly answer the questions and handed in the questions and answers before leaving class.

Originally, the author prepared a schedule of ten reference books to be discussed every day. On the first day of the study, Mrs. Gorman had to number the students off into groups and to explain what items to look for in every book. She could easily present the information about ten books in a lecture in one day, but the group members could not discuss ten books in one day. In most groups one individual took a book, looked it over, and presented his findings about it to the rest of his group. Then, the other group members looked at that particular book. Therefore, the books scheduled for discussion on the first day were held over for the second day, too. In the lecture section on the second day, Mrs. Gorman did some grammar work which was completely unrelated to this study. Because this procedure in the discussion groups took longer than the author had anticipated, the number of books discussed or lectured upon in one day was limited to five or six.³⁰

³⁰See Appendix B, pp. 38-39.

After the "selected" reference books had been completely studied, a post-test was administered to both sections. Then, the students' scores on the two tests were compared.

Test questions were selected from various sources. Test items were obtained from the Iowa Tests of Educational Development, from the Iowa Basic Skills Tests, from library skills tests from the Perfection Form Company in Logan, Iowa, and from former tests of the instructor. Neither the pre- nor the post-test was necessarily valid for four reasons. First, it was not tested often enough for it to be considered valid. It was presented to these research study students on the first time. Second, the research study had no control group. Third, the population was not randomly selected. The students were members of this study because of their schedules. Finally, the sample size for the study was too small. Only fifty-two students participated in this study.

ANALYSIS OF DATA

Data from the pre-test and the post-test are presented in four ways. First, frequency distributions for both tests will be presented and discussed. Second, individual student's scores will be shown. Third, the means of both tests will be given. Fourth, the standard deviations of both tests will be discussed. Finally, a t test will be used to find out if the difference between two means is

great enough for it to be judged significant.

The frequency distributions of scores for the pre-test in both the lecture section and the discussion section were slightly different, as shown in Table 1. The lecture section had higher scores on the pre-test than the discussion section did. While the highest score in the discussion section was 29, the highest in the lecture was 31. The same was true for the lowest scores: the lowest score in the lecture section was only 6; whereas, the lowest in the discussion was 5. Therefore, the range for the lecture section was only 16; meanwhile, the range for the discussion section was 25.

Table 1
Frequency Distributions of Scores on Pre-test
for Reference Books

Lecture		Discussion	
Scores	f	Scores	f
39-41	0	39-41	0
36-38	0	36-38	0
33-35	0	33-35	0
30-32	2	30-32	0
27-29	1	27-29	2
24-26	3	24-26	4
21-23	7	21-23	6
18-20	3	18-20	7
15-17	8	15-17	2
12-14	1	12-14	3
9-11	0	9-11	1
6- 8	1	6- 8	0
3- 5	0	3- 5	1
0- 2	0	0- 2	0
	<u>N=26</u>		<u>N=26</u>

The frequency distributions of scores for the post-test are more diverse in the lecture section and the discussion section. In Table 2 the reader can see that the scores overall were higher. Scores in the lecture section were grouped closer together with a high score of 33 and a low score of 21. In the discussion section the scores were more widely distributed with a high score of 33 and a low score of 15. Therefore, the range in the lecture section was only 13; whereas, the range in the discussion section was 19.

Table 2
Frequency Distributions of Scores on Post-test
for Reference Books

Lecture		Discussion	
Scores	f	Scores	f
39-41	0	39-41	0
36-38	0	36-38	0
33-35	2	33-35	1
30-32	7	30-32	4
27-29	8	27-29	8
24-26	4	24-26	8
21-23	5	21-23	3
18-20	0	18-20	0
15-17	0	15-17	2
12-14	0	12-14	0
9-11	0	9-11	0
6- 8	0	6- 8	0
3- 5	0	3- 5	0
0- 2	0	0- 2	0
	<u>N=26</u>		<u>N=26</u>

Table 3 shows the students' individual scores on both the pre-test and the post-test. In the lecture section

all of the students raised their scores on the post-test from their scores on the pre-test. Two students in the discussion section, however, received lower scores on the post-test. At the same time three students in the discussion section earned the same scores on both the pre-test and the post-test.

Table 3

Students' Individual Scores on Pre- and Post-tests
in the Lecture and the Discussion Sections

Lecture			Discussion		
Student	Pre	Post	Student	Pre	Post
1	15	22	1	12	26
2	22	29	2	20	28
3	26	29	3	22	28
4	13	24	4	19	17
5	20	23	5	23	28
6	16	27	6	15	28
7	17	29	7	22	30
8	24	30	8	29	28
9	17	21	9	20	30
10	22	28	10	13	24
11	18	32	11	19	27
12	17	29	12	25	30
13	22	30	13	20	24
14	18	22	14	9	15
15	17	31	15	22	22
16	30	33	16	24	24
17	31	33	17	24	25
18	29	31	18	15	23
19	21	31	19	28	28
20	21	29	20	23	28
21	6	25	21	26	30
22	16	21	22	5	24
23	21	24	23	21	26
24	23	27	24	19	21
25	17	25	25	13	33
26	26	31	26	19	26

No significant difference can be seen in the means of the scores for the lecture section and the discussion section on the pre-test. The mean for the lecture section was 20.5 on the pre-test; the mean for the discussion section was 20.1.

On the post-test the means of the scores for the lecture section and the discussion section were different. The mean for the lecture section was 28.0 on the post-test; the mean for the discussion section was 26.5.

Of the four instances, three of them represented normal bell-shaped curves. One of them, however, was skewed. The standard deviations for the discussion sections revealed normal bell-shaped curves. On the pre-test the standard deviation was 5.6, and on the post-test it was 4.2. In the lecture section the standard deviation for the pre-test was 5.4, representing a normal bell-shaped curve. But the standard deviation for the post-test contained no scores in the third standard deviation from the mean. The standard deviation was 3.7.

By using the t test, the author could compare the two means of the post-test to see if there is any significant difference in the performance of the two groups of students when using two different methods of instruction. The t test results showed that there is a significant difference at the .05 level. In other words, a significant difference in student learning achievement as measured by an author-constructed post-test in an English 10 library skills

unit of "selected" reference books has been found between the lecture method and the small group discussion method of teaching.

As a result of this research study, the author must reject her null hypothesis. She found the significant superiority of the lecture method. Table 4 summarizes the data of this research study.

Table 4
Summary of Data on Post-test
for Reference Books

Group	Number in Group	Standard Deviation	Mean	(T) Test
Lecture	26	3.7	28.0	
Discussion	26	4.2	26.5	1.7

SUMMARY (FINDINGS AND INTERPRETATIONS)

In this research study the author tried to determine which method of instruction--the lecture or the small group discussion--would achieve the best learning results as measured by an author-constructed post-test in an English 10 library skills unit of "selected" reference books for average-ability sophomores at Fort Dodge Senior High School, Fort Dodge, Iowa.

The instructor of these two English 10 sections designated the third-hour section as the lecture section which was taught strictly by lecture with no physical contact with these "selected" reference books. She designated

the fourth-hour section as the discussion section which was taught strictly by small group discussion with no definite assistance from the instructor. Before the research study project both sections studied other areas of library skills. Then, the students took the pre-test for reference books. After the study of these "selected" reference books, the students took the post-test for reference books.

In analyzing the data, the author found a significant difference in student learning achievement as measured by the author-constructed post-test in English 10 library skills unit of "selected" reference books between the lecture and the small group discussion methods of teaching. On the post-test the mean of the scores was 26.5 for the discussion section, but it was 28.0 for the lecture section. After using the t test, the author found a significant difference of the two means at the .05 level. This finding caused the author to reject her null hypothesis of no significant difference between the lecture and the small group discussion teaching methods in favor of the significant superiority of the lecture method.

Several factors could account for these findings. First, the discussion section, or fourth-hour class, was divided because of the lunch shift. In anticipation of lunch, students were often more restless and careless during that period of the day. Therefore, the students in small groups might have discussed personal activities more than they discussed the "selected" reference books.

Furthermore, students in periods three and four are generally more active and talkative because of the time of day. Since this research study was conducted in September, some of the days were rather warm.

Second, the ability and the intelligence of the lecture section was slightly higher than that of the discussion section. The average centile composite on the Iowa Tests of Educational Development for the lecture section was 57; whereas, the average for the discussion section was 42. Although these students were average-ability, sometimes higher average-ability students naturally were together in one section because of their whole schedules.

Finally, as other researchers had found, students in lecture sections took notes from the instructor's lecture in which she included all of the information that the students needed to know. The students in the discussion section, on the other hand, generally discussed what the instructor had told them to search for in the books.

In this research study the author rejected her null hypothesis of no significant difference in student learning achievement as measured by an author-constructed post-test in English 10 library skills unit of "selected" reference books between the lecture and the small group discussion methods of teaching. When measuring learning achievement on immediate recall, she found the significant superiority of the lecture method of teaching.

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APPENDIXES

APPENDIX A. Reference Books Pre-test

DIRECTIONS: Select from the lettered choices the correct answer. Write this letter beside the corresponding number for that question on the answer sheet. Do NOT write on this test paper.

1. Which of these would it be best to consult to find the name of the strait that lies between the islands of Borneo and Sumatra? (A) National Geographic Magazine, (B) Webster's Geographical Dictionary, (C) a globe, (D) an atlas.
2. Which of these would you consult to find the proper wording for a formal invitation to a party announcing a girl's engagement? (A) a gazetteer, (B) Magazines like Mademoiselle, (C) Social Register, (D) Emily Post's Etiquette.
3. Where would you look to find the author of these lines?
"Here once the embattled farmers stood,
And fired the shot heard round the world."
(A) In Stevenson's Home Book of Quotations, (B) In a history of the Revolutionary War, (C) In an anthology of American poetry, (D) In a dictionary of rhymes.
4. Where could you most easily find four or five words to be used as synonyms for the word value? (A) In Bartlett's Familiar Quotations, (B) In a composition textbook, (C) In Roget's Thesaurus, (D) In the table of contents of an economics textbook.
5. Where would you look to find the title of the play which contains these lines? "All the world's a stage, And all the men and women merely players." (A) In a history of the theater, (B) In Theatre Arts, (C) In Bartlett's Familiar Quotations, (D) In Encyclopedia Britannica.
6. Where would you be most likely to find the name of the head of the state highway department in Iowa? (A) The World Almanac and Book of Facts, (B) U. S. Government Organization Manual, (C) Official state government handbook, (D) Who's Who in America.

7. Where would you look to find the correct procedures for conducting a meeting of a committee planning a charity drive? (A) In the Congressional Record, (B) In Robert's Rules of Order, (C) In Emily Post's Etiquette, (D) In Red Cross publicity literature.
8. In which of the following would you look to find the title of a book that includes John Masefield's poem "Sea Fever"? (A) Readers' Guide to Periodical Literature, (B) Granger's Index to Poetry and Recitations, (C) Bartlett's Familiar Quotations, (D) An anthology of English poetry.
9. Where would you find the most up-to-date list of the world's champion tennis players? (A) In an encyclopedia, (B) In The World Almanac and Book of Facts, (C) In a daily newspaper, (D) In Who's Who.
10. Which of these would you expect to find in a reference work called Statistical Abstracts? (A) Figures on the amount of coal produced in the U. S., (B) Reproductions of abstract paintings, (C) Lessons in mathematics, (D) Articles on the lives of famous philosophers.
11. Almanacs contain information about (A) important events of the year, (B) sports records, (C) the population of the world, (D) all of the above, (E) none of the above.
12. A bound collection of maps, charts, and tables is known as (A) an atlas, (B) an abstract, (C) an anthology, (D) a yearbook, (E) an almanac.
13. Statistical records of last year's National Football League would be found in (A) Sports Illustrated, (B) The First Book Atlas, (C) Current Biography, (D) The World Almanac and Book of Facts, (E) Who's Who in America.
14. The best place to find current figures on the population of the ten largest cities in the United States is in (A) The World Almanac and Book of Facts, (B) The New Book of Knowledge, (C) Webster's Geographical Dictionary, (D) The World Book, (E) None of the above sources.
15. Information about living Americans of importance may be found in (A) Dictionary of American Biography, (B) Who Was When, (C) International Biography, (D) Who's Who in America, (E) All of these.
16. Quotations from the works of the English poet, Rudyard Kipling, would be found in (A) Bartlett's Familiar Quotations, (B) Granger's Index to Poetry and Recitations, (C) Essay and General Literature Index, (D) A Treasury of the World's Great Speeches, (E) The Document File.

17. The biographies of former Presidents of the United States no longer living may be found in (A) Who's Who in America, (B) Current Biography, (C) Twentieth-Century Authors, (D) Readers' Guide to Periodical Literature, (E) Dictionary of American Biography.
18. The most recent biographical information on Chris Evert, currently in the news, is most likely found in (A) Who's Who, (B) Who's Who in America, (C) Dictionary of American Biography, (D) Current Biography, (E) The American Magazine.
19. The most efficient source designed to help the user find a word or phrase synonymous with the word greatness is (A) Bartlett's Familiar Quotations, (B) An elementary dictionary, (C) Roget's Thesaurus, (D) The American Encyclopedia, (E) The Britannica Encyclopedia.
20. All of the following reference books are correctly paired with an example of the kind of information that may be found in them except (A) Who's Who in America--the home address of Dean Rusk, (B) World Almanac and Book of Facts--a synopsis of patent procedures, (C) Current Biography--a picture and biographical sketch of William Golding, (D) Short Story Index--critical comment on a short story by Hemingway.
21. To find the age of a popular movie star, the fastest, most convenient source would be (A) Readers' Guide, (B) Current Biography, (C) Dictionary of American Biography, (D) World Almanac and Book of Facts.
22. The home address of the U. S. Secretary of State may be found in (A) The Statesman's Yearbook, (B) World Almanac and Book of Facts, (C) Who's Who, (D) Current Biography.
23. For a class report on a living personality, you are expected to give many details of his personal life. A good source of information would be (A) The American Dictionary of Biography, (B) Who's Who, (C) Current Biography, (D) The World Almanac and Book of Facts.
24. If you know the first line of a poem, you can find the titles of books that contain the entire poem in (A) Readers' Guide, (B) Granger's Index to Poetry and Recitations, (C) Home Book of Verse, (D) Bartlett's Familiar Quotations.
25. For information on a modern poet, the most helpful reference would be (A) Current Biography, (B) Twentieth Century Authors, (C) Dictionary of American Biography, (D) World Almanac and Book of Facts.

26. You have just been elected to the office of homeroom president. To learn how to conduct your first meeting, a helpful source would be (A) Post's Etiquette, (B) Robert's Rules of Order, (C) World Almanac and Book of Facts, (D) Vital Speeches.
27. You are looking for a descriptive word to tell how your friend walks. The best place to find a good word to use in place of walk would be (A) Roget's Thesaurus, (B) American College Dictionary, (C) Webster's Unabridged Dictionary, (D) Funk and Wagnall's Dictionary.
28. Current statistics of various kinds may be obtained from (A) A card catalog, (B) Readers' Guide, (C) World Almanac and Book of Facts, (D) Book Review Digest.
29. Sketches of living Americans can be found in (A) Current Biography, (B) Dictionary of American Biography, (C) Who Was Who, (D) Statistical Abstract.
30. The Statistical Abstract of the United States contains (A) information about the history of property, (B) records of property transactions, (C) information obtained in the census, (D) a short history of the United States.
31. Statistical information about governments of the world would be found in (A) The Statesman's Yearbook, (B) Readers' Guide, (C) the card catalog, (D) The Statistical Yearbook.
32. You can find a description of Christmas customs in (A) Chambers Book of Days, (B) Readers' Guide, (C) Who's Who, (D) Dictionary of Phrases and Fable.
33. To find famous proverbs and quotations, you could look through the book Famous Quotations, edited by (A) Walker, (B) Stevenson, (C) Roget, (D) Bartlett.
34. In which book would you look to find the population of Reinbeck, Iowa? (A) A geography Textbook, (B) An atlas, (C) World Almanac and Book of Facts, (D) Who's Who.
35. You can find the French word for window in (A) Readers' Encyclopedia, (B) Iowa Official Register, (C) World Almanac and Book of Facts, (D) French dictionary.
36. Which reference book contains the information about the state rock of Iowa? (A) Information Please Almanac, (B) Webster's Geographical Dictionary, (C) Iowa Official Register, (D) Readers' Encyclopedia.

37. You can find a biblical quotation for a commencement speech in (A) a biblical concordance, (B) Readers' Encyclopedia, (C) Bartlett's Familiar Quotations, (D) Chamber's Book of Days.
38. You need to know in which of Charles Dickens' novels Little Nell appeared. Which of these references will contain the correct title? (A) Short Story Index, (B) Who Was Who, (C) Readers' Encyclopedia, (D) World Almanac and Book of Facts.
39. In which of the following would you look to find the title of a book that includes Ring Lardner's short story "Haircut"? (A) Play Index, (B) Readers' Encyclopedia, (C) Short Story Index, (D) Bartlett's Familiar Quotations.
40. You cannot use an encyclopedia, but you need to find out some basic information about Peru. Which of these books would you use? (A) Webster's Geographical Dictionary, (B) Statesman's Yearbook, (C) an atlas, (D) Readers' Encyclopedia.

ANSWER KEY

1 -- D	21 -- B
2 -- D	22 -- B
3 -- A	23 -- C
4 -- C	24 -- B
5 -- C	25 -- A
6 -- C	26 -- B
7 -- B	27 -- A
8 -- B	28 -- C
9 -- B	29 -- A
10 -- A	30 -- C
11 -- D	31 -- D
12 -- A	32 -- A
13 -- D	33 -- D
14 -- A	34 -- B
15 -- D	35 -- D
16 -- A	36 -- C
17 -- E	37 -- A
18 -- D	38 -- C
19 -- C	39 -- C
20 -- D	40 -- B

APPENDIX B. Schedule for Research Study Project

Friday, September 12

Pre-test for reference books

Monday, September 15

Dictionary of American Biography

Current Biography

Webster's Biographical Dictionary

Who's Who in America

Who Was Who in America

Twentieth Century Authors

Contemporary Authors

European Authors 1000-1900

Who's Who

British Authors of the Nineteenth Century

Tuesday, September 16

Finish biographical references that were started on Monday.

Wednesday, September 17

Discuss research assignment and bibliographic entry form.

Thursday, September 18

New Cassell's French Dictionary

Larousse Modern French-English Dictionary

Roget's Thesaurus

Webster's Dictionary of Synonyms

Allen's Synonyms and Antonyms

Law Dictionary of Practical Definitions by

Edward J. Bander

Readers' Encyclopedia

Friday, September 19

Stevenson's Home Book of Quotations

Bartlett's Familiar Quotations

Harper's Topical Concordance

Granger's Index to Poetry

Short Story Index

Play Index

Monday, September 22

World Almanac
Information Please Almanac
Statesman's Yearbook
Hammond Ambassador World Atlas
Rand McNally New Cosmopolitan World Atlas
Webster's Geographical Dictionary

Tuesday, September 23

Iowa Official Register
Post's Etiquette
Statistical Abstract of the United States
(American Almanac)
Robert's Rules of Order
American Book of Days

Wednesday, September 24

Values Clarification

Thursday, September 25

Post-test on reference books

APPENDIX C. Bibliography of Materials
Studied Prior to the Research Study Project

"The Card Catalog" (filmstrip), Library Filmstrip Center,
1962.

"Choosing Books to Read" (16mm film), Coronet.

"Effective Writing: Research Skills" (16mm film), Coronet.

"Readers' Guide" (kit), Library Filmstrip Center, 1969.

Santa, Beaul M., and Lois Lynn Hardy. How to Use the
Library. Palo Alto, California: Pacific Books, 1955.