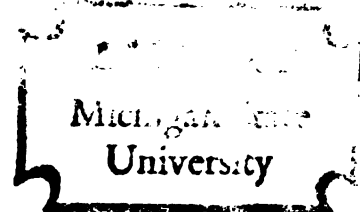


THE EFFECT OF COURSE INTENSITY
ON ACADEMIC ACHIEVEMENT, STUDENT
ATTITUDES, AND MORTALITY RATE

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
JOSEPH LEWIS MAZANEC
1972



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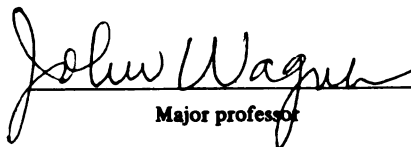
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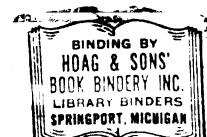
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ABSTRACT

THE EFFECT OF COURSE INTENSITY ON ACADEMIC
ACHIEVEMENT, STUDENT ATTITUDE,
AND MORTALITY RATE

Joseph Lewis Madsen

At the community junior college level the mortality rate for many courses often exceeds 10 per cent, where either not passing or withdrawing is considered as a mortality. It was hypothesized this problem could be alleviated if the student was permitted to concentrate his efforts on one or two courses for a shorter period of time. To test this hypothesis three classes, French, English, and Political Science, were taught at Delta College in three different time modes. The courses in the first time mode were called Intensive and had the students taking the courses sequentially, one at a time, with each three semester-hour course meeting three hours daily for three weeks. The courses in the second time mode were called Semi-Intensive in which the students took two courses concurrently with each course meeting seven hours per week for slightly more than six weeks.

The courses in the third time mode were the regular semester courses meeting three hours per week for fifteen weeks.

ABSTRACT

THE EFFECT OF COURSE INTENSITY ON ACADEMIC ACHIEVEMENT, STUDENT ATTITUDES, AND MORTALITY RATE

By

Joseph Lewis Mazanec

Testing for differences in academic achievement

At the community junior college level the mortality rate for many courses often exceeds 50 per cent, where either not passing or withdrawing is classified as a mortality. It was hypothesized this problem could be alleviated if the student was permitted to concentrate his efforts on one or two courses for a shorter period of time. To test this hypothesis some Algebra, Speech, English, and Political Science courses were taught at Delta College in three different time modes. The courses in the first time mode were called Intensive and had the students taking the courses sequentially, one at a time, with each three semester-hour course meeting three hours daily for three weeks. The courses in the second time mode were called Semi-Intensive in which the students took two courses concurrently with each course meeting seven hours per week for slightly more than six weeks.

type questionnaire.

The courses in the third time mode were the regular semester courses meeting three hours per week for fifteen weeks. Academic achievement there were no differences in the It was the purpose of this study to determine if there actually was a difference in the intensive, semi-intensive, and regular courses with respect to: (1) Academic achievement, (2) Mortality rate, (3) Students' attitudes, and (4) Instructor's attitudes. Testing for differences in academic achievement was done primarily using analysis of covariance with pre-test scores used as the covariate for post-test scores. Secondary and supportive analysis was accomplished using the final course grade as the criterion for academic achievement. When differences did occur, Scheffé post hoc analysis was used to determine which time mode was superior. The analysis of mortality rates was done via chi-square contingency tables or the Fisher Exact Test. To determine if differences existed in student attitudes toward instruction under the three treatments an evaluation form was subdivided into four categories: (1) Attitudes, (2) Teaching Skills, (3) Course Organization, and (4) Overall. Since these categories are not independent, the analysis was accomplished using multi-variate analysis of variance. The instructors' opinions about the three approaches were determined using a subjective type questionnaire. for all the courses except College

Findings

When the pre-test and post-test scores were used to define academic achievement there were no differences in the three treatments for College Algebra and Speech, the six-week Intermediate Algebra was better than the fifteen-week class, both the six- and fifteen-week Freshman Composition classes were superior to the three-week classes, and the three-week Political Science course was better than the six-week course which in turn was better than the fifteen-week course.

Using the final course grade as the criterion of achievement, no difference could be found for the algebra courses, both the three- and six-week treatments were superior to the fifteen-week treatment for Political Science, the six-week Speech course was better than the fifteen-week course, and in English the three-week courses produced higher grade point averages than did the fifteen-week courses. This latter reversal can be explained, at least partially, by an uncontrolled instructor grading variable.

Except for the mathematics, where there were no differences in the mortality rate, the fifteen-week student courses had a higher mortality rate than did either the three- or six-week courses.

Analysis of the Student Evaluation of Instruction Form revealed that for all the courses except College Mathematics.

Algebra any differences that existed between the three-, six-, and fifteen-week groups could be attributed to a single category. In Speech, Teaching Skills were rated higher in the three- and six-week courses than they were in the fifteen-week course. The Overall category was rated lower by the three-week English classes than by the six-week classes. Political Science showed no differences and the fifteen-week Intermediate Algebra class rated the instructor better in the Attitude category than did the three-week class. In College Algebra the fifteen-week class rated the instructor better than both the three- and six-week classes in Attitudes and Teaching Skills but only better than the three-week class in the Overall category.

When questioned as to whether they preferred taking these courses in three weeks, six weeks, or fifteen weeks, the people who had taken the courses in fifteen weeks, while showing a slight preference for the fifteen-week courses, were not strongly enough opinionated to reject the hypothesis of equal preference. The people who had taken the courses in six weeks definitely preferred the courses in the six weeks. The students who had taken the courses in three weeks preferred the Political Science and Speech in three weeks but were just about equally divided as to if they preferred the three-week or six-week treatment for English and Mathematics.

The Instructor Questionnaire found all of the teachers, except for the one teaching mathematics, favorably inclined toward teaching classes in shorter periods of time. The Political Science and Speech teachers preferred the three-week classes while the English instructors thought the six-week classes were better. Some of the advantages listed for the shorter duration courses were better course continuity, the instructor gets to know the students better and more quickly, and fewer office hours are required for help outside of class.

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THE EFFECT OF COURSE INTENSITY ON ACADEMIC
ACHIEVEMENT, STUDENT ATTITUDES,
ACKNOWLEDGMENTS
AND MORTALITY RATE

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A THESIS

My parents, family, and friends for their faith
in me.

Submitted to
To all of Michigan State University gratitude and
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IV. ANALYSIS OF RESULTS.

ACT Composite Scores (Standard)	35
High School Average	36
Planned Educational Majors	38
Educational Aspirations	40
Academic Achievement	43

Chapter	Page
Mathematics Achievement	43
Intermediate Algebra Achievement	45
College Algebra Achievement	50
Political Science Achievement	52
Speech Achievement	59
English Achievement	64

Chapter	Summary	Page
I. THE PROBLEM		1
Need		2
Purpose		5
Overview		6
II. REVIEW OF THE LITERATURE		7
Rate of Withdrawal from College		7
Reason for Withdrawal from College		8
Massed Versus Distributed Practice-- Laboratory Setting		11
Massed Versus Distributed Practice-- Field Setting		13
III. DESIGN OF THE STUDY		20
Selection of Courses		20
Selection of the Sample		21
Sequencing the Courses		23
Hypotheses		25
Instrumentation		25
Academic Achievement		25
Validity		26
Reliability		27
Attitudes		28
Mortality		30
Instructor's Opinion		31
Summary		31
IV. ANALYSIS OF RESULTS		33
ACT Composite Scores (Standard)		35
High School Average		36
Planned Educational Majors		38
Educational Aspirations		40
Academic Achievement		43

Chapter	Page
Mathematics Achievement	43
Intermediate Algebra Achievement	45
College Algebra Achievement	50
Political Science Achievement	52
Speech Achievement	59
English Achievement	64
SUMMARY	
Summary	75
Mortality.	77
APPENDICES	
Appendix	
Fisher Exact Test	77
Intermediate Algebra Mortality.	78
College Algebra Mortality	79
English Mortality	80
Speech Mortality	82
Political Science Mortality.	84
SUMMARY	
Summary	87
Student Evaluation of Instruction.	87
Student Evaluation of Speech	89
Time Preference--Speech	92
Student Comments	93
Student Evaluation of English	94
Time Preference--English.	96
Student Comments	97
Student Evaluation of Political Science.	99
Time Preference--Political Science	99
Student Comments	101
Student Evaluation of College Algebra	102
Time Preference--College Algebra	106
Student Comments	107
Student Evaluation of Intermediate Algebra	108
Time Preference--Intermediate Algebra	110
Student Comments	111
Summary	113
Time Preference.	114
Student Comments	115
Instructors' Opinion	118
Summary of Instructor Opinion	137
V. SUMMARY AND CONCLUSIONS	140

Chapter	Page
Findings	141
Conclusions	144
Discussion	146
Implications	151
LIST OF TABLES	
BIBLIOGRAPHY	154
APPENDICES	
Appendix	
A. Letters	157
B. Achievement Examination	163
C. Student Evaluation of Instruction	180
D. Instructor Questionnaire	184
4-4. Educational Aspirations (In Percentages)	41
4-5. Comparison of Mathematics Students ACT Composite Scores	45
4-6. Pre-Test and Post-Test Means--Intermediate Algebra	46
4-7. Analysis of Covariance--Intermediate Algebra	46
4-8. Adjusted Post-Test Means--Intermediate Algebra	47
4-9. Grade Point Average--Intermediate Algebra	49
4-10. Analysis of Variance--Intermediate Algebra GPA	49
4-11. Pre-Test and Post-Test Means--College Algebra	50
4-12. Analysis of Covariance--College Algebra	50
4-13. Adjusted Post-Test Means--College Algebra	51
4-14. Grade Point Average--College Algebra	51
4-15. Analysis of Variance--College Algebra GPA	52
4-16. Pre-Test and Post-Test Means--Political Science	53

Table	Page
4-17. Analysis of Covariance--Political Science	53
4-18. Adjusted Post-Test Means--Political Science	54
4-19. Pre-Test and Post-Test Means--Political Science A.	54

LIST OF TABLES

Table	Page
3-1. Pattern of Course Offerings	24
4-1. Percentage of Students in Various Test Score Intervals ACT Composite	35
4-2. Percentage of Students in Various High School Average Categories	37
4-3. Planned Educational Majors (In Percentages).	39
4-4. Educational Aspirations (In Percentages).	41
4-5. Comparison of Mathematics Students ACT Composite Scores	45
4-6. Pre-Test and Post-Test Means--Intermediate Algebra	46
4-7. Analysis of Covariance--Intermediate Algebra	46
4-8. Adjusted Post-Test Means--Intermediate Algebra.	47
4-9. Grade Point Average--Intermediate Algebra	49
4-10. Analysis of Variance--Intermediate Algebra GPA	49
4-11. Pre-Test and Post-Test Means--College Algebra	50
4-12. Analysis of Covariance--College Algebra	50
4-13. Adjusted Post-Test Means--College Algebra	51
4-14. Grade Point Average--College Algebra	51
4-15. Analysis of Variance--College Algebra GPA	52
4-16. Pre-Test and Post-Test Means--Political Science	53

Table	Page
4-17. Analysis of Covariance--Political Science . .	53
4-18. Adjusted Post-Test Means--Political Science .	54
4-19. Pre-Test and Post-Test Means--Political Science A.	54
4-20. Adjusted Post-Test Means--Political Science A.	55
4-21. Pre-Test and Post-Test Means--Political Science B.	55
4-22. Adjusted Post-Test Means--Political Science B.	56
4-23. Grade Point Average--Political Science . . .	57
4-24. Analysis of Variance--Political Science GPA .	57
4-25. Pre-Test and Post-Test Means--Speech. . . .	60
4-26. Analysis of Covariance--Speech.	60
4-27. Adjusted Post-Test Means--Speech	61
4-28. Grade Point Average--Speech.	62
4-29. Analysis of Variance--Speech GPA	62
4-30. Grade Point Average--Speech.	63
4-31. Pre-Test and Post-Test Means--Two-Way English.	66
4-32. Two-Way Analysis of Covariance--English. . .	67
4-33. Adjusted Post-Test Means--Two-Way English . .	68
4-34. Grade Point Average--Two-Way English . . .	68
4-35. Analysis of Variance--Two-Way English GPA . .	69
4-36. ACT--English Scores	69
4-37. Pre-Test and Post-Test Means--English . . .	70
4-38. Analysis of Covariance--English	71
4-39. Adjusted Post-Test Means--English.	71

Table	Page
4-40. Grade Point Average--English	73
4-41. Analysis of Variance--English GPA	73
4-42. Mortality Table--Intermediate Algebra	78
4-43. Mortality Table--College Algebra.	79
4-44. Mortality Table--English	80
4-45. Mortality Table--English Professor H	81
4-46. Mortality Table--English Professor K	82
4-47. Mortality Table--Speech	82
4-48. Mortality Table--Speech A	83
4-49. Mortality Table--Speech B	84
4-50. Mortality Table--Political Science	84
4-51. Mortality Table--Political Science A	86
4-52. Mortality Table--Political Science B	86
4-53. Means--Student Evaluation of Speech.	90
4-54. Student Evaluation--Speech	90
4-55. Time Preference--Speech	92
4-56. Means--Student Evaluation English	94
4-57. Student Evaluation--English	95
4-58. Time Preference--English	97
4-59. Means--Student Evaluation of Political Science	99
4-60. Time Preference--Political Science	100
4-61. Means--Student Evaluation of College Algebra.	102
4-62. Student Evaluation--College Algebra.	103
4-63. Time Preference--College Algebra	106

Table	Page
4-64. Means--Student Evaluation of Intermediate Algebra	108
4-65. Student Evaluation--Intermediate Algebra	109
4-66. Time Preference--Intermediate Algebra	110
4-67. Time Preference--One Semester Later.	114

The college student is the typical student who typically tries to study four or five subjects. The mortality rate for students is high, usually caused by dropout or by failure, often caused by lack of concentration, especially at the Community Junior-Senior College. A high fatality rate may in part be caused by the fact that courses being an interference factor for the student's concentration. A student often concentrates on one subject almost to the exclusion of the others. This concentration may be voluntary as the student becomes fascinated with a subject, or forced because the student must exert the extra effort to achieve a satisfactory grade in the course. In either case, the work in the remaining courses is bound to suffer.

Another aspect of the mortality problem occurs when a student is absent from school for two or three weeks because of illness. Unless he is exceptional, he is forced to choose between withdrawing from school for that term or face the prospect of jeopardizing his

educational plan by being placed on academic probation. In either case, the student might well miss his educational objectives by a term or more.

CHAPTER I

Need

It was felt that THE PROBLEM of later problems could be alleviated if the student would be allowed to concentrate. The college student in the United States today typically tries to study four or five courses per term. The mortality rate for students in these courses, either by dropout or by failure, often exceeds 50 per cent--and especially at the Community Junior College level. This high fatality rate may in part be caused by some of the courses being an interference factor for the other courses. A student often concentrates on one subject almost to the exclusion of the others. This concentration may be voluntary as the student becomes fascinated with a subject, or forced because the student must exert the extra effort to achieve a satisfactory grade in the master-course. In either case, the work in the remaining courses is bound to suffer. The student finishes. Another aspect of the mortality problem occurs when a student is absent from school for two or three weeks because of illness. Unless he is exceptional, he is forced to choose between withdrawing from schooling for that term or face the prospect of jeopardizing his

educational plan by being placed on academic probation. In either case, the student might well delay his educational objectives by a term or more.

It was hoped that the student being involved with only one or two courses at Need would allow him to

become more deeply immersed in the work of the course. It was felt that perhaps both of these problems could be alleviated if the student would be allowed to concentrate his efforts on one or two courses for a shorter period of time. With this in mind it was decided to test the effects of utilizing "intensive" and "semi-intensive" approaches to learning with regard to the student's academic achievement and his attitudes toward the courses, the instructors, and education in general.

The conventional three-semester-hour course at Delta College meets three hours per week for fifteen weeks--a total of forty-five contact hours. Under the intensified approach to learning, the student takes his courses sequentially, one at a time with a three-semester-hour course meeting three hours daily for three weeks--a total of forty-five contact hours. The student finishes one course, including the final examination, before proceeding on to the next course.

Under the semi-intensified approach, the student takes his courses two at a time for six weeks, finishing

the two courses before proceeding on to two other courses. Each of the courses again meets for forty-five contact hours. the pattern of course scheduling at Delta College could be. It was hoped that the student being involved with only one or two courses at a time would allow him to become more deeply immersed in the work of the course, to be able to pursue corollary interests or topics on which are somewhat tangential to the mainstream of the coursework, and that his more intensive involvement with the course and its professor would result in closer relationships between the student and the instructor. In addition to being freed from the distracting demands of many courses and instructors, the student would also be freed from an examination week with four or five finals. In fact, at Delta College until recently the semester exams were all scheduled to be given in two and one-half days, and even now only three days are scheduled for giving the final examinations. Traditionally, college calendars are set up so that there are only three or possibly four periods during the year when a student may enroll and begin his studies. Many times a student decides to attend college only to find it is not during these periods and he must wait, perhaps as much as several months, before he may formally begin his college education. on probation in the event he is unable to complete the

semester. It was felt that if the intensified and semi-intensified approaches to learning proved to be effective, the pattern of course scheduling at Delta College could well be revolutionized. No longer would enrollment be restricted to three or possibly four times a year, but would become a continuous process throughout the year with the subsequent less concentrated demands on the student personnel officers allowing them more time for individual counseling. Courses of only three, four, or six weeks duration would provide the college with a tremendous increase in the flexibility of scheduling courses. The fact that students concentrate on one or two courses at a time would result in the advantage of being able to schedule field trips and other off-campus learning experiences with less interference with other courses. sessions. While there is much opinion expressed,

both pro Under the conventional semester system, the student who, because of illness, is absent from school for two or three weeks finds himself faced with a difficult decision. Should he withdraw from school and leave four

Purpose
It is the purpose of this study to determine if there actually is a difference in the effectiveness of the three approaches to learning--the intensified, the semi-intensified, and the regular semester or conventional--and if a difference does indeed exist to probation in the event he is unable to complete the

semester satisfactorily. Under the intensified or semi-intensified approaches to learning this student would drop only one or two courses and be able to re-enroll with a maximum delay of two or three weeks.

The intensified approach would also enable many industries to extend to other employees benefits heretofore restricted to management; namely, short courses, meeting more frequently, over a more concentrated period of time. In Chapter III, some of the pertinent related literature is reviewed, while in Chapter IV, the problem being studied is defined, bask at the usual fifteen to eighteen weeks.

The semi-intensified approach to learning has essentially been used at many colleges and universities during their summer sessions, and the intensified approach has been used at universities utilizing "post" summer sessions. While there is much opinion expressed, contrasting the three-week "intensive," the six-week "semi-intensive," and the fifteen-week "summer session" approaches, there is little research data available to verify these opinions.

The summary, conclusions, and implication of the research are presented. It is the purpose of this study to determine if there actually is a difference in the effectiveness of the three approaches to learning--the intensified, the semi-intensified, and the regular semester or conventional--and if a difference does indeed exist to

determine which of the approaches is most effective, thus removing the answers to these questions from the realm of opinion.

Overview

The remainder of this paper is concerned with examining the effects of having students take fewer courses, meeting more frequently, over a more concentrated period of time. In Chapter II, some of the pertinent related literature is reviewed, while in Chapter III, the problem being studied is defined, hypotheses are generated, population and sample specified, and the statistical analysis used to compare and contrast the group is discussed.

Chapter IV deals with the analysis of the results of the statistical tests that were done comparing and contrasting the three-week "intensive," the six-week "semi-intensive," and the fifteen-week "conventional" courses. A discussion of the relevant findings of this study will also be in Chapter IV. The summary, conclusions, and implications for future research are presented in Chapter V.

Achievement (Newark: University of Delaware, 1953).
(Hereinafter referred to as College Achievement.)

²Robert E. Iffert, Retention and Withdrawal of College Students (Washington, D.C.: Department of Health, Education, and Welfare, 1953), pp. 15-20.

first year and approximately 47 per cent by the end of the second year. Summerskill¹ reviewed the literature related to attrition at college year colleges and found appreciably in the last forty years.

CHAPTER II

REVIEW OF THE LITERATURE

Reason for Withdrawal from College

Withdrawal rates at the college level are constantly being examined and reported. Some studies examine ability while others study intellectual and non-intellectual factors as related to college grades and success. Zaccaria and Creaser² found at the University of Chicago

Rate of Withdrawal from College

Several studies have looked at the withdrawal rate in the first or second year of college. Pemberton¹ observed that at the University of Delaware approximately one-third of his sample withdrew within the first two years. Iffert² found a somewhat larger percentage of students withdrawing from colleges in California indicating that 31 per cent withdrew by the end of the

¹W. A. Summerskill, "Graphs from College," in *The American College*, ed. by Hewitt Sanford (New York: Wiley, 1935).

²W. A. Pemberton, Ability, Values and College Achievement (Newark: University of Delaware, 1963). (Hereinafter referred to as College Achievement.)

²Robert E. Iffert, Retention and Withdrawal of College Students (Washington, D.C.: Department of Health, Education, and Welfare, 1958), pp. 15-20.

³Frederick Brown and Robert Callis, "Why College Freshmen Drop Out," Journal of College Student Personnel, 1 (1959), 23-26.

first year and approximately 47 per cent by the end of the second year. Summerskill¹ in 1962 extensively reviewed the literature related to attrition in four-year colleges and found the rate has not changed appreciably in the last forty years.

Reason for Withdrawal from College

Pemberton² suggested the primary reason for leaving college was academic difficulty, but noted that about one-third of the total who left school were in good academic standing at the time of withdrawal.

Zaccaria and Creaser³ found at the Circle Campus of the University of Chicago the major factor contributing to attrition, voluntary as well as involuntary, was an unsatisfactory academic record with 75 per cent of withdrawing students having a C average or less.

Brown and Callis⁴ more specifically indicated that approximately 37 per cent of the students who dropped were officially dropped for academic reasons,

¹John Summerskill, "Dropouts From College," in The American College, ed. by Nevitt Sanford (New York: Wiley, 1962).

²Pemberton, College Achievement.

³Lucy Zaccaria and James Creaser, "Factors Related to Persistence in an Urban Commuter University," Journal of College Student Personnel, XII (1971), 286-91.

⁴Frederick Brown and Robert Callis, "Why College Freshmen Drop Out," Journal of College Student Personnel, I (1959), 23-26.

another 30 per cent voluntarily withdrew, and 32 per cent finished the semester but did not return. A comprehensive study by Slocum¹ of 1951, 1952, 1953 freshmen withdrawal rates at the State College of Washington indicated that 51 per cent of the dropouts were in academic difficulty at the time of withdrawal. Only 31 per cent, however, acknowledged that low grades had either been important or very important in their decision to withdraw.

In a study of dropouts at thirteen small private colleges, Hannah² found dropouts were more complex, more impulsive, more anxious, less personally integrated, less altruistic, and less willing to exert an effort to make a good impression before their peers or their teachers than nondropouts.

Pervin³ surveyed the Princeton graduating classes of 1940, 1951, and 1960. The general conclusions were that differences in academic ability between dropouts and nondropouts had decreased through the years. Few

¹W. L. Slocum, "Social Factors Involved in Academic Mortality," College and University, XLII (1965), 53-64.

²William Hannah, "Personality Differentials Between Lower Division Dropouts and Stay-ins," Journal of College Student Personnel, XII (1971), 16-19.

³Lawrence Pervin, "Counseling the College Dropout," Journal of College Placement (1965), 31.

dropouts claimed lack of ability as a reason for leaving school. The reasons cited for leaving school were:

(1) poor motivation and maturity, (2) general lack of interest, (3) boredom, (4) apathy, (5) dislike for the curriculum, (6) lack of goals, and (7) a lack of certainty as to what major to choose.

Hedlund and Jones¹ in studying the effect of student personnel services on the completion rate in twenty-eight community colleges in the state of New York found that the colleges with less students per counselor (450 or less:1) reported higher completion rates.

Hannah² found that students contemplating dropping out of college discussed their problem with a friend of the same sex, a parent, or a friend of the opposite sex and only after a decision had already been made did they contact college personnel.

The general conclusion drawn from the review of these studies is that while academic difficulties are not the only reason for withdrawal from college programs, it appears to be the primary reason. Other problems

¹ Dalva Hedlund and J. Terry Jones, "Effect of Student Personnel Services on Complete Rate in Two-Year Colleges," Journal of College Student Personnel (1970), 196-99.

² William Hannah, "Withdrawal from College," Journal of College Student Personnel, X (1969), 397-402.

that students encounter such as financial, personal, or social problems appear to contribute or be a part of the academic difficulties confronting students who withdraw.

Massed Versus Distributed Practice--
Laboratory Setting

While much research has been done in the last ten years studying the effects of massed versus distributed practice, most has been in a laboratory setting involving motor skills or memorization. The conclusions of these laboratory experiments vary extremely. Most of the research agrees with that of Houston¹ in which he found in list memorization distributed practice is superior to massed practice. Others like Allen² and Montgomery³ found no significant difference in the effect of massed or distributed practice on short-term memory.

¹John P. Houston, "List Differentiation and Distributed Practice," Journal of Experimental Psychology, LXXII, No. 3 (1966), 477-78.

²C. K. Allen, "Effects of Massed and Distributed Practice in Short-Term Memory" (unpublished Ph.D. dissertation, Ohio State University, 1963).

³M. A. P. Montgomery, "Effects of Various Rates of Presentation in Combination with Massed and Spaced, Concurrent and Non-Concurrent Practice Modes on Film-Mediated Perceptual Motor Performance" (unpublished Ph.D. dissertation, University of Indiana, 1967).

Some like Mangum¹ have concluded that a fixed amount of time is required to learn a fixed amount of material regardless of the way the time is distributed over trials by varying the interitem presentation time.

Zacks² investigated the principle of total-time invariance, i.e. the amount learned in a specified interval of time was fixed, regardless of how that time was distributed. He found no significant difference in total learning time of learning two successive lists of paired associates when the items were presented at a fixed rate on both study and test trials, and when the subjects were allowed to study each pair as long as they wished on study trials, or when the subjects could take test trials whenever they choose.

Completing the gamut studies like Stelmach³ concluded that learning under massed conditions was more efficient as the overall time elapsed was less,

¹R. E. Mangum, "Effects of Interitem Presentation Time and Learning Rate on Learning" (unpublished Ph.D. dissertation, University of Missouri, Columbia, Missouri, 1967).

²Rose Greenbloom Zacks, "The Invariance of Total Learning Time Under Different Conditions of Practice" (unpublished Ph.D. dissertation, University of California, Berkeley, 1967).

³G. E. Stelmach, "Effectiveness of Motor Skills Practice as a Function of Various Practice Schedules" (unpublished Ph.D. dissertation, University of California, Berkeley, 1967).

although actual practice time was not necessarily less. Fishman, et al.,¹ found that in spelling drills the students learned quicker with massed practice but retained better with distributed practice.

Selection-maturation Interaction
that summer: Massed Versus Distributed Practice--
Field Setting

The semi-intensified approach to learning has essentially been used at many colleges and universities during their summer sessions. While there is much opinion expressed, both pro and con, regarding the effectiveness of such an approach, there is little research data available to verify these opinions.

According to Campbell and Stanley:

Internal validity is the basic minimum without which any experiment is uninterpretable: Did in fact the experimental treatments make a difference in this specific experimental instance? External validity asks the question of generalizability: To what populations, settings, treatment variables, and measurement variables can this effect be generalized?²

The selection factor essentially means that the differences that occurred could well have come about through the differential recruitment of persons making up the group. The way the groups were selected for the

¹E. J. Fishman, Leo Keller, and R. C. Atkinson, "Massed Versus Distributed Practice in Computerized Spelling Drills," Journal of Educational Psychology, LIX (August, 1968), 290-98.

²Donald Campbell and Julian Stanley, Experimental and Quasi-Experimental Designs for Research (Chicago: Rand McNally & Co., 1966), p. 5.

comparison is the cause of the differences rather than the treatment the groups received. In other words, the students that attend summer sessions are not typical of those in attendance during the regular semester.

Selection-maturation interaction refers to the fact that summer session students have usually already completed a year of college and thus have developed insights about college and courses that the typical new freshman student would not have yet developed, and any differences observed might well be attributed to this fact rather than to the variance in course intensity.

Most schools have done little or nothing to control the selection factor or the selection-maturation interaction effect on internal validity, so any conclusions that are drawn concerning their summer sessions remain in the realm of opinion. The same objections apply to such quasi-experimental projects as the "Oppenheimer-Correll Plan" at the University of Colorado where the semester is divided into two eight-week sessions with the student taking two four-semester-hour courses each session. To quote from a 1969 correspondence with Professor Correll:

In general, the students who have taken our program have been extremely enthusiastic--, they do a more devoted and committed job of their studies, although I cannot point to any evaluation involving controlled groups and the like.¹

Owen Scott, "A Comparison of Summer School and Regular Session Achievement in 11th Grade American History," *Journal of Educational Research*, LIX (1966), 225-27.

¹Malcolm Correll, personal letter.

Scott,¹ in a study comparing the achievement in 11th-grade American History of better than average high school students (averaged about the 75 percentile IQ), utilized matched pairs (school, sex, chronological age, mental age, and enrolled for original credit) and concluded that students in summer school (intensive course) achieve as well or better than similar regular session students. He reported no data on student attitudes.

The fact that Scott was comparing summer session students with regular session students leaves his study open to the question of the effect on internal validity. Although he utilized matched pairs, the difference in motivation of the student who would elect to take a summer session course from that of a student in the regular session might well be enough to account for the positively slanted results in favor of the intensive course.

The United States military services have utilized massed practice or intensive courses with favorable results. Of course, the motivation factor (failure in the military results in the person acquiring a less desirable MOS designation) could well be considerably less in a college course.

Florian L. Caldwell, "The Mini-Quarter at DeAnza College, California," Journal of the League for Innovation in the Community College, X (April 74), 1972.

¹Owen Scott, "A Comparison of Summer School and Regular Session Achievement in 11th Grade American History," Journal of Educational Research, LIX (1966), 235-37.

The Mini-Quarter at DeAnza College, Cupertino, California of six weeks duration beginning midway through the winter quarter was originally designed to aid integration of students leaving a semester educational institution into one using the quarter system, but in practice has come to benefit a much wider student population. The students enrolled in the Mini-Quarter

Caldwell states:

Those who find the Mini-Quarter of most value are:

1. mid-year high school graduates
2. college students transferring from a semester to a quarter system
3. currently enrolled students who were not able to fill their programs during regular Winter Quarter registration
4. individuals recently moved into the area after Winter Quarter registration had ended
5. individuals who discovered an educational or vocational need after the quarter began and would have lost their enthusiasm for meeting that need if they had been required to wait an additional three months.¹

In a subsequent correspondence Dean Caldwell reports:

The holding power of the Mini-Quarter appears better than that of the regular quarter. The drop rate was less than 3% whereas the regular quarter normally experiences a 5% to 6% drop rate.²

Dean Caldwell's comments about the holding power of the Mini-Quarter have questionable statistical

¹Florian L. Caldwell, "The Mini-Quarter at DeAnza College, Cupertino, California," Jottings from the League for Innovation in the Community College, X (April 24, 1972).

²Florian L. Caldwell, personal letter.

significance. His cautious wording and no indication of the number of students involved leads one to the conclusion that while the dropout rate is better for the Mini-Quarter it is not significantly so. It seems the only statistical computation that was done was the dropout percentage.

The students enrolled in the Mini-Quarter have the advantage of being given continuing student priority in registering for the Spring Quarter rather than being processed as new students.

At Hiram College in Ohio, the single course study plan (intensive courses) was in effect from 1948 to 1958. Initially, the program elicited favorable reactions and results from the students and faculty. The popularity of the program gradually deteriorated until in 1958, the plan was modified considerably and in 1961 was abandoned in favor of a more traditional quarter system. According to Eckelberry,¹ the small size of the institution precluded any controlled experimentation.

According to Menefee,² Mt. Vernon College in Washington, D.C. has recently converted their college

¹R. H. Eckelberry, "Editorial Comments--Hiram Study Plan Revised," Journal of Higher Education, XXIX (April, 1958), 225-34.

²Audrey Menefee, "Liberating the Academic Calendar," Junior College Journal, XLI (March, 1971), 66-70.

calendar to one utilizing a modular system where students may take classes of three, six, or twelve weeks duration. The results appear favorable with grade-point averages improved; the dean's list lengthened; and probation lists shortened.

As two letters of inquiry about this program, especially the statistical data, have gone unanswered, I can only conclude that no definitive study has been made.

At Merritt College, Oakland, California, the recent change from the semester system to the quarter system provided Mangham¹ with the opportunity to study the relationship between academic ability and performance under both systems. By studying students who had been in attendance at Merritt College for at least one semester and two quarters, Mangham suggests that the fearful concern among some educators that low ability junior college students (9th percentile or lower on the School and College Ability Test) will not fare as well under the quarter system as they will under the semester is unwarranted, as evidenced by grade-point average. Nor was any significant difference found for high ability (80th percentile or higher on SCAT) students. Persistence

¹Clarence W. Mangham, "A Study of the Relationship Between Student Academic Ability and Student Performance Under the Quarter and Semester Systems in a Junior College" (unpublished Ph.D. dissertation, University of California, Berkley, 1970).

as measured by withdrawal rates were similarly found nonsignificantly different. Student feelings as elicited via telephone interviews with a 20 per cent randomly selected sample indicated that both groups favored the quarter system as they liked the increased pace and greater pressure which they experienced under this system. It was less drawn out and less boring.

One criticism of this study is the fact that by the very nature of the sample a selection factor has been introduced, i.e. only those students who have been in attendance at Merritt College for at least one semester and two quarters are included--not any student who had washed out before completing these requirements was considered.

From the review of these studies, one must conclude that the ideas proposed for this study are not new--while they have been tried on various occasions there has been little done in the sense of controlled experimentation. Most of the conclusions drawn still remain in the realm of opinion with no reliable statistical data to support them.

On the students involved courses had to be selected that would enable the students to earn a minimum of twelve credit hours during the semester. From the Delta College course offerings the high enrollment courses that seemed to best provide

the student with basic general education requirements were selected. The courses selected were:

- (1) Political Science 103--Introduction to American

CHAPTER III

Government. A course of this type is required

by the state of Michigan of all students on a degree program.

DESIGN OF THE STUDY

(2) This study was designed to determine if any differences existed; and if so, where they existed between the intensified, the semi-intensified, and the conventional-semester approaches to learning with regard to:

- (1) The student's academic achievement;
- (2) The student's attitudes toward instruction, the course, and the instructor;
- (3) The dropout and failure rate; and
- (4) The instructor's attitudes toward instruction.

Selection of Courses

In order to do any reasonable experimentation without imposing a hardship on the students involved during the 1970 Fall semester at Delta College, a community college serving primarily the three counties of Bay, Saginaw, and Midland in central Michigan, courses had to be selected that would enable the students to earn a minimum of twelve credit hours during the semester. From the Delta College course offerings the high enrollment courses that seemed to best provide take all four subjects, the population was essentially reduced to incoming freshmen as other students would

the student with basic general education requirements were selected. The courses selected were:

(1) Political Science 103--Introduction to American Government. A course of this type is required by the state of Michigan of all students on a degree program.

(2) English 111--Freshmen Composition. This is another course required of most degree-oriented students.

(3) Speech 112--Principles of Public Speaking.

Most students on a transfer curriculum are required to take this course.

(4) Either Mathematics 119--Intermediate Algebra or Mathematics 122--College Algebra. These courses were selected because they were high enrollment courses that seemed to fit in the general education core requirement.

At these meetings, Mr. [Name] explained the project to the students, told them of the textbooks

The sample was selected from students enrolled Delta College would send them as incentive for participation, and answered any questions they might have concerning the project. The students were told if they enrolled in the project, their enrollment schedules would have to be changed to include the four courses.

As each student involved in the study was to take all four subjects, the population was essentially reduced to incoming freshmen as other students would

have already had at least one of these courses. With the aid of the Delta College Data Processing Center, a list of these incoming freshmen who were registered in one of the mathematics courses was compiled as it was felt they would be the most likely candidates for the study. As the number of students in this category was insufficient a search for those enrolled in any three of the four subjects, and eventually any two of the four subjects was made. The students seemed to be mostly from the curriculum preference categories "general," "liberal arts," "undecided," or "no preference."

The students on these lists were sent letters (see Appendix) inviting them to attend one of several half-hour sessions explaining "a special program which should prove beneficial and interesting to them." If they could not attend any of the sessions, they were asked to call the counselor assigned to the project, Mr. Stephen Konowalow.

At these sessions, Mr. Konowalow explained the project to the students, told them of the textbooks Delta College would lend them as incentive for participation, and answered any questions they might have concerning the project. The students were told if they enrolled in the project their pre-enrollment schedules would have to be changed to include the four courses selection devices, namely a die and a coin. The results of this process had the first experimental

of the project, and they would be randomly assigned to either three-week, six-week, or fifteen-week courses--they could not select the one they wanted.

Under these conditions about seventy-five students had been enlisted and the supply of potential candidates had been exhausted. The original design for this study required between 90 and 120 students depending upon their distribution between the algebra courses. The Office of the Academic Dean of Delta College felt the study was of enough significance to warrant running in a modified form. The modified design had intact classes used for control groups (fifteen-week courses) with the seventy-five volunteers randomly assigned to the three- and six-week courses via random number tables. This procedure should, if anything, bias the results in favor of the fifteen-week courses as they would now contain some sophomores and second-semester freshmen instead of just freshmen encountering collegiate study for the first time. A more complete description of the sample will appear in the next chapter.

Int. Alg. Sequencing the Courses Sc. & Speech

In order to limit the argument of bias introduced by the selection of the course sequencing, the order in which the courses were taught was established via random selection devices, namely a die and a coin. The results of this process had the first experimental

group (E_1) take Political Science the first three weeks, Speech the next three weeks, followed by English the next three weeks, and concluding with College Algebra the last three weeks. The second experimental group (E_2) took Speech the first three weeks, Political Science the next three weeks, followed by Intermediate Algebra the next three weeks, and concluded with English the last three weeks. Experimental group E_3 took two courses, Intermediate Algebra and English, the first six weeks followed by Political Science and Speech the last six weeks, while experimental group E_4 took College Algebra and English the first six weeks, and Political Science and Speech the last six weeks.

TABLE 3-1.--Pattern of course offerings

	1st 3 weeks	2nd 3 weeks	3rd 3 weeks	4th 3 weeks
E_1	Pol. Sc.	Speech	English	Coll. Alg.
E_2	Speech	Pol. Sc.	Int. Alg.	English
	1st 6 weeks		2nd 6 weeks	
E_3	Int. Alg. & English		Pol. Sc. & Speech	
E_4	Coll. Alg. & English		Pol. Sc. & Speech	

The hypothesis of no difference between the three approaches to learning with respect to the students' academic achievement was tested by two methods.

First, analysis of covariance Hypotheses used with pre-test scores. The temptation in formulating hypotheses is to directionalize all results; but because of the diverse conclusions reached on related research, the directionalization does not seem warranted; thus the hypotheses will be stated in the null form. Cooperative Mathematics Test--

Algebra II. College Algebra utilized the Cooperative Mathematics Test--Algebra III.

Hypothesis 1:
There will be no differences in academic achievement between the three approaches to learning. (This hypothesis will be examined for each of the five subjects involved in the study.) Instruments. Copies are included in Appendix

Hypothesis 2:
Val There will be no differences in the student's attitudes towards instruction between the three approaches to learning. measures of developed abilities and thus their content validity is of primary

Hypothesis 3:
importance. Content validity is best insured by
There will be no differences in the mortality rates between the three approaches to learning. (This hypothesis will also be examined for each of the five subjects involved in the study.) teaching objectives.

Hypothesis 4:
the procedure used in selecting the mathematics
There will be no differences in the instructor's attitudes toward instruction with respect to the three approaches to learning.
examinations which by title appeared to be appropriate.

These tests were then Instrumentation ad hoc committee consisting of three members of the Delta College Academic Achievement

mathematics division who narrowed the selection to three tests that seemed appropriate. These three tests were then reviewed, item by item, by the whole mathematics students' academic achievement was tested by two methods.

First, analysis of covariance was used with pre-test scores used as the covariate for post-test scores, and next, analysis of variance was used on the final course grade.

Intermediate Algebra was tested using the Educational Testing Services Cooperative Mathematics Test--Algebra II. College Algebra utilized the Cooperative Mathematics Test--Algebra III.

Political Science, English, and Speech were tested using locally constructed instruments. Copies are included in Appendix

Validity

The tests used are measures of developed abilities and thus their content validity is of primary importance. Content validity is best insured by entrusting test construction to persons well-qualified to judge the relationship of test content to teaching objectives.

The procedure used in selecting the mathematics tests was first to collect as many specimen copies of examinations which by title appeared to be appropriate. These tests were then screened by an ad hoc committee consisting of three members of the Delta College Mathematics Division who narrowed the selection to three tests that seemed appropriate. These three tests were then reviewed, item by item, by the whole mathematics

division with the resultant selection of the Educational Testing Service Cooperative Mathematics Tests as the best available for use in the study.

The instructors involved with the teaching of Political Science, Speech, and English Composition analyzed the instruments available commercially to measure achievement in their respective disciplines and found them to be inappropriate. Thus, the instruments used to test achievement in Political Science, Speech, and English Composition were constructed primarily by the instructors involved with subsequent examination and modification by senior members of the respective departments to insure their validity.

Reliability

The mathematics tests have had reliability coefficients computed using the Kuder-Richardson Formula 20 and were obtained from sub-samples selected randomly from the norm group.¹

<u>Test</u>	<u>Form</u>	<u>Reliability</u>
Algebra II	A	.84
	B	.89
Algebra III	A	.84
	B	.80

The Evaluation Form was subdivided into four categories: (1) Attitudes, (2) Teaching Skills,

¹ Handbook: Cooperative Mathematics Tests (New Jersey: Educational Testing Service, 1964), Table 48, p. 63.

(3) Course The Political Science test was computed to have a Split-Half Reliability Coefficient of .83.

The English and Speech were tested using subjective type instruments and thus do not readily lend themselves to reliability studies.

The English Composition grading was felt to be the most susceptible to influence via instructor bias. In order to neutralize any such influence that might have occurred each pre- and post-test was graded by three English instructors that were in no way associated with the project, with the resultant mean grade used for the analysis. The grading of the English pre-tests and post-tests was not completed until after the project had terminated, so the results were not used in the determination of the student's English grades.

Attitudes

Under the assumption of homogeneity of student attitudes before treatment, analysis of variance was used to determine if a difference in student attitudes existed after the different treatments. A modification of a locally constructed Student Evaluation of Instruction (Appendix C) form was used for this analysis.

The Evaluation Form was subdivided into four categories: (1) Attitudes, (2) Teaching Skills,

(3) Course Organization, and (4) General. The student was to rate the instructor from one to nine on each question with one being best.

Some questions on the evaluation form could very well fit into more than one category. In order to determine the degree of agreement or disagreement in the placement of the questions into the four categories five individuals, both colleagues and educational consultants, were asked to perform the categorization independently. The results were remarkably consistent with each case of a discrepancy explained with, "I was debating whether it should be placed here or there, it could have gone either way." For the purpose of this study, the questions were categorized as follows:

Attitudes

- Instructor's Enthusiasm for the Subject
- Attitude Toward Students
- Attitude Toward Differences of Opinion
- Sense of Humor
- Willingness to Help Students and be Available for Help

Teaching Skill

- Knowledge of Subject
- Teaching Skill
- Explanations, Answers to Questions
- Poise and Self-Confidence

Management or Course Organization

- Organization of the Course
- Assignments
- Examination Questions
- Method of Grading

General Opinion

Enjoyment of the Course
Rating of Instructor as Compared with Others
study, it was felt that a subjective evaluation of the
three. Since the four evaluation categories are not
independent (i.e. a student ranking an instructor high
in one category would also tend to rank him high in the
others while a student ranking the instructor low in
one category would also tend to rank him low in the
other three), the two-way analysis of variance assumption
of independence is violated and multivariate analysis
of variance must be used.

Summary

The sample for this study was selected from the
Also included were open-ended questions pertain-
incoming freshmen class of Delta College in the fall of
ing to like or dislike of the project with respect to
1970. The experimental groups consisted of all volun-
the subject matter, the instructor, the time of the day
teers while the control groups were intact classes.
and the intensity of the course, and a question on
The courses selected for the study were English Compo-
sition, Principles of Public Speaking, Introduction to
Government, and Intermediate Algebra or College

Mortality
Algebra Mortality for the purpose of this study is
defined as any student that either withdrew from the
course or received a grade of D or E. These were all
classified as failures. The analysis of the pass-
failure rates was done via chi-square contingency
tables and where the conditions for chi-square were
not satisfied the Fisher Exact Test was used.
which method was superior. To determine if differences
existed in student attitudes toward instruction under

Instructor's Opinion

As only five instructors were involved in the study, it was felt that a subjective evaluation of the three approaches to learning was the most appropriate. The Instructor Questionnaire (Appendix D) inquired about preference, advantages and disadvantages, applicability to disciplines, special student and instructor characteristics required, and necessity of alteration of teaching techniques.

Summary

The sample for this study was selected from the incoming freshmen class of Delta College in the Fall of 1970. The experimental groups consisted of all volunteers while the control groups were intact classes. The courses selected for the study were English Composition, Principles of Public Speaking, Introduction to American Government, and Intermediate Algebra or College Algebra as they are all high enrollment courses satisfying basic general education requirements. The courses were sequenced using random selection devices. Differences in academic achievement were tested using post-test scores and analysis of covariance with the pre-test score as the covariate. When differences did occur, Scheffé post hoc analysis was used to determine which method was superior. To determine if differences existed in student attitudes toward instruction under

the different treatments an evaluation form was subdivided into four categories: (1) Attitudes, (2) Teaching Skills, (3) Course Organization, and (4) General. These forms were analyzed using multivariate analysis of variance. The analysis of mortality (withdrawals and grades of D or E) was done via chi-square contingency tables or the Fisher Exact Test. The instructors'

The first phase of this study was to compare and contrast the profile of the students in this project determined using a subjective type questionnaire, with the profile of the Delta College student population, the Michigan community college student population, and the national community college student population. It was hoped the students taking courses in three and six weeks (hereinafter called the "project") would have the same profile as other Delta College students who in turn would have the same profile as the other community college students, both in Michigan and nationally, so the results obtained by this study could be generalized. For this reason all hypotheses generated about the differences are stated in the null form.

As about 65 per cent of the students in the project and about 75 per cent of all Delta College freshmen had taken the ACT (American College Testing Program) and data are available for both Michigan and nationally, it was the prime vehicle for making comparisons. The national data were from two types of institutional

CHAPTER IV

ANALYSIS OF RESULTS

The first phase of this study was to compare and contrast the profile of the students in this project with the profile of the Delta College student population, the Michigan community colleges student population, and the national community college student population. It was hoped the students taking courses in three and six weeks (hereinafter called the "project") would have the same profile as other Delta College students who in turn would have the same profile as the other community college students, both in Michigan and nationally, so the results obtained by this study could be generalized. For this reason all hypotheses generated about the differences are stated in the null form.

As about 65 per cent of the students in the project and about 75 per cent of all Delta College freshmen had taken the ACT (American College Testing Program) and data are available for both Michigan and nationally, it was the prime vehicle for making comparisons. The national data were from two types of institutional

classifications, as classified under the U.S. Office of Education system by highest level of educational offering. A Type 1 institution offers at least two but less than four years of work beyond the twelfth grade. They include community colleges, junior colleges, technical institutes, and normal schools offering at least a two-year program of college-level studies. National Class Profile Norms represent a 10 per cent sample of the enrolled students for all Type 1-4 colleges (those offering two-year programs, bachelor's degrees, master's degrees, and doctor of philosophy degrees) participating in the 1970-71 ACT Class Profile Service. Thus this sample may be considered as representative of the population of enrolled college freshmen in the fall term at Type 1-4 ACT-participating colleges and universities. However, this sample is not completely representative of American higher education as there is geographic bias in ACT participation and private colleges and universities are under-represented. The norms over-represent college-bound students in the Midwest, Rocky Mountains and Plains, and the South and under-represent those in the Northeast and Middle Atlantic States.¹

¹American College Testing Program, Your College Freshmen (Iowa City, Iowa, 1971), p. 60.

ACT Composite Scores (Standard)

The ACT composite score is a composite of the English, Mathematics, Social Science, and Natural Science scores, thus a general measure of scholastic aptitude.

Hypothesis 1:

There will be no difference in ACT composite scores between Delta College students and Michigan community college students.

Hypothesis 2:

There will be no difference in ACT composite scores between Project students and Delta College students

TABLE 4-1.--Percentage of students in various test score intervals ACT composite

	1-15	16-20	21-25	26-36	n	Mean	Standard Deviation
Type I ^a	32	38	24	5	95728	17.8	4.8
Michi- gan ^b	33	37	24	5	14861	17.6	4.9
Delta ^c	35	35	24	5	1623	17.4	5.3
Project	8	40	42	10	48	20.6	3.8

^aThe American College Testing Program, Your College Freshmen: Interpretative Guide to ACT Research Services for Higher Education (Iowa City, Iowa, March, 1971), Table S-1.1 "ACT Test Score Norms for Type I Colleges," p. 167.

^bThe American College Testing Program, Class Profile Service Report: Michigan Community College Composite Report 1970, p. 5.

^cThe American College Testing Program, Class Profile Service Report: Delta College 1970, p. 5.

Because of the format in which the statistical data were presented in the various sources, the most appropriate statistical test to employ appeared to be a normal probability distribution significance test for difference of means. Computation of $Z = 1.45$ indicated there was not sufficient evidence to conclude the ACT composite scores of Delta College students were different from those of Michigan community college students.

In testing Hypothesis 2, that there will be no difference in ACT composite scores between Project students and Delta College students, a Z value of $Z = 5.62$ was found giving the probability of Hypothesis 2 being true to be less than .0000001. Clearly this hypothesis must be rejected and by the nature of the difference one must conclude that the scores of the Project students were superior to those of the other Delta college students who took the ACT.

High School Average

Another measure of general scholastic ability that was readily available from ACT sources is High School Grade. The students were requested to report their most recent high school grade in English, Mathematics, Social Science, and Natural Science on their ACT profile card. Product moment correlations were computed from contingency tables formed by student-reported and

school-reported grades. The regressions were clearly linear and the distributions were only moderately skewed. The correlations between self-reported and school-reported grades ranged from .91 to .93.¹

TABLE 4-2.--Percentage of students in various high school average categories

	0-1.4	1.5-2.4	2.5-3.4	3.5-4.0	n	$\bar{x}$	s
Type I ^a	5	51	37	6	95728	2.38	.66
Michigan ^b	3	48	43	6	14005	2.41	.58
Delta ^c	4	52	39	6	1529	2.37	.58
Project	0	44	51	5	41	2.43	.51

^aAmerican College Testing Program, Your College Freshmen, p. 172.

^bAmerican College Testing Program, Michigan Community College Composite Report 1970, p. 7.

^cAmerican College Testing Program, Delta College 1970, p. 7.

Hypothesis:

High school averages of Project students will not differ from those of other Delta College students.

Again using the normal probability distribution significance test for a difference of means a calculated $Z = .74$ was insufficient to reject the hypothesis. One cannot conclude there is a difference in High School averages.

¹American College Testing Program, Technical Report, 1965 ed., pp. 22-23.

Planned Educational Majors

In order to determine if undue bias was introduced in the sample by including unusual numbers of special types of students or elimination of other types of students, a comparison of the planned educational majors of project students, Delta College students, and Michigan Community College students was made.

As indicated earlier, in the explanation of how the students were selected for the study, most of the students came from curriculum preference categories "general" or "undecided." This is certainly borne out by the statistics in the "Planned Educational Majors" chart, with 50 per cent undecided. This may just mean that the students in the project were intelligent enough not to get locked-in on a specific curriculum until they have had the opportunity to sample offerings from diverse educational areas and then select the area in which they found the most promise. According to Baird¹ usually such students appear to be no different from other students except that they are undecided.

It seems that students from three areas were by their very nature almost excluded from the project. The Health Field at Delta College consists primarily of Nursing, X-Ray Technology, and Dental Technology, all

¹Leonard L. Baird, "The Undecided Student--How Different Is He?" ACT Research Report No. 22 (1967).

TABLE 4-3.--Planned educational majors (in percentages)

	Michigan ^a (14667)	Delta ^b (1605)	Project (48)
Educational Fields	15	16	10
Social Science and Religious Fields	8	7	12
Business, Political, and Persuasive Fields	20	20	17
Scientific Fields	4	3	6
Health Fields	13	12	2
Arts and Humanities	9	10	-
Engineering	7	7	-
Trade, Industrial, and Technical	8	9	2
Other or undecided	16	15	50

^aAmerican College Testing Program, Michigan Community College Report 1970, p. 12.

^bAmerican College Testing Program, Delta College Report 1970, p. 12.

of which have special course offerings and laboratories with time conflicts which would almost exclude them from the study. The same can be said for the Trade, Industrial and Technical Field which at Delta would mean those on technology programs leading to a two- or three-year Associate Degree or certificate--either of which would have a rather rigid schedule with no flexibility for taking the four courses required for the project. The third area, that by its nature would exclude students from participating in the study, is Engineering. These students would tend to start their mathematics at the Calculus level--not at the Intermediate or College Algebra level. There was one group which was not represented in the sample, the Arts and Humanities Majors. Logically it seems that this area should have had a higher percentage of representation in the project than in Delta College or Michigan Community College. Upon discussing this matter with several colleagues and the counselor that was associated with the project, no reason could be found for lack of representation.

Educational Aspirations

In general, classes which are characterized by high educational aspirations would be expected to contain fewer "unexplained" dropouts. Such classes would probably be less resistant to traditional academic

requirement and procedures than a class with lower aspirations. To see how the Project students compared with other Delta College students and other community college students in Michigan and nationally with respect to their educational aspirations, the following has been compiled.

TABLE 4-4.--Educational aspirations (in percentages)

	National ^a (49755)	Michigan ^b (14752)	Delta ^c (1609)	Project (48)
Certificate Program (less than 2 years)	2	5	4	2
Two-Year College Degree	12	27	30	19
Bachelor's Degree	46	39	38	48
Master's Degree	23	16	16	23
Doctorate (Ph.D., Ed.D., M.D., D.D.S.)	9	5	6	4
Other	9	8	7	4

^aAmerican College Testing Program, Your College Freshmen, p. 74.

^bAmerican College Testing Program, Michigan Community College Composite Report 1970, p. 12.

^cAmerican College Testing Program, Delta College Report 1970, p. 12.

It seems the Project students aspired at about the same level as the national norms which were based on all college students rather than just community college

students. The Project students appeared to have somewhat higher educational aspirations than the other Delta College students and community college students in Michigan with a smaller percentage of the Project students aspiring at the Associate Degree level and a higher percentage aspiring for the Bachelor's and Master's Degree. This again tends to indicate that the students in the Project were an atypical group aspiring a little higher than the typical community college student.

In summary, it appears that the students selected for participation in the Project were somewhat different than other students from Delta College, or the community college students in Michigan or in the nation. They were superior in the ACT composite score but not significantly different high school grades. They had different levels of educational aspiration with a larger percentage aspiring the Bachelor's and Master's Degree level. Differences also occurred in planned educational majors with a much larger percentage of Project students in the "undecided" category. Some educational majors, such as in the Health, Trade, Industrial, and Technical Fields, had essentially been excluded from the study because of the rigid structure of their curriculum. Another, Engineering, had essentially been excluded because the student in an engineering curriculum would usually be

starting their mathematics with calculus rather than the Intermediate Algebra or College Algebra offered in the study.

Academic Achievement

The usual measure of academic achievement is the grade received in the course, and this criterion was used, testing for differences in the intensive, semi-intensive, and semester courses via analysis of variance. One weakness in the use of the final grades as the measure of academic achievement is that they do not take into account the differences in the entry level of the student. A class that is superior initially will most likely end up with higher grades than a class that enters the course with a weaker background. To compensate for any initial differences that might have existed at the entry level, another analysis of academic achievement was done, this time via analysis of covariance with pre-test scores used as the covariate for post-test scores. All hypotheses were tested at the .05 significance level.

Mathematics Achievement

There were two mathematics courses included in the study--Intermediate Algebra and College Algebra. Each of these courses was analyzed separately as the students taking these courses vary considerably in

certain characteristics--especially academic preparation. The Intermediate Algebra course usually attracts students who are less well prepared academically than the "average" student. Intermediate Algebra is essentially the same course that is offered as Algebra II in most high schools and the majority of students who have been preparing themselves for college will have already taken the course in high school. College Algebra, on the other hand, is similar to the "fast Track" or "honors" algebra courses that are usually offered only by the larger high schools. Most of the students whose intended educational major is engineering, a physical science, or mathematics will have had the equivalent of College Algebra prior to entering college if their high school offers such a course, and thus would not be included in this study.

Hypothesis:

Students starting the collegiate mathematics study on the College Algebra level are superior academically to those starting on the Intermediate Algebra level.

To test this hypothesis a Normal Probability Distribution one-sided significance test on difference of means was used on ACT COMPOSITE scores. In this way not just mathematical preparation but general academic aptitude or preparation was tested. To achieve a significant difference at the 0.05 level of significance a "Z- value of 1.65 must be exceeded.

TABLE 4-5.--Comparison of mathematics students ACT composite scores

	Mean	Standard Deviation	Number
College Algebra	21.3	4.33	33
Intermediate Algebra	18.5	4.26	44

Computation of a Z - value of $Z = 2.79$ gave the probability of this difference occurring by chance to be less than 0.0025. On the basis of ACT composite scores at least, the College Algebra students were superior to the Intermediate Algebra students.

Intermediate Algebra Achievement

The primary means of testing academic achievement in Intermediate Algebra was via analysis of covariance using pre-test scores as the covariate for post-test scores. The instruments used were Forms A and B of the Cooperative Testing Service--Algebra II.

Hypothesis:

There will be no differences in mathematics achievement between students taking Intermediate Algebra in three weeks, six weeks, or fifteen weeks.

As the probability of these differences occurring due to chance was less than 0.035, it was concluded there was a difference, and post-hoc analysis was

TABLE 4-6.--Pre-test and post-test means--Intermediate Algebra

	Mean Pre-Test Score	Mean Post-Test Score	n
3 week	136.47	146.00	19
6 week	136.60	147.15	20
15 week	137.00	142.50	16

TABLE 4-7.--Analysis of covariance--Intermediate Algebra

Between Mean Square	F	Degrees of Freedom	Probability
115.29	3.59	2 and 51	0.035

required. The raw regression coefficient between the pre-test and post-test scores was computed to be 0.68

The following formula¹ is used to calculate adjusted post-test means:

$$\hat{Y}_i = Y_i - R (X_i - \bar{X})$$

where:

- $\hat{Y}_i$ = adjusted mean post-test score for treatment "i."
- Y_i = mean post-test score for treatment "i."
- R = raw regression coefficient between pre-test and post-test scores.
- X_i = mean pre-test score for treatment "i."
- $\bar{X}$ = mean of all pre-test scores.

¹This formula was obtained from the Office of Research Consultation, College of Education, Michigan State University.

TABLE 4-8.--Adjusted post-test means--Intermediate Algebra

Treatment	Adjusted Post-test Mean
3 week	146.15
6 week	147.21
15 week	142.29

Now Scheffé post hoc analysis must be done on the adjusted post-test means. Given any comparison "g" made on the data after a significant F has been found for the relevant factor, the significance of the comparison value $\hat{\phi}_g$ may be found using the following 100 (1-d)% Confidence interval:¹

$$\hat{\phi}_g - \sqrt{\frac{(J-1) F_{\alpha} MS_b \omega_g}{F}} < \phi_g < \hat{\phi}_g + \sqrt{\frac{(J-1) F_{\alpha} MS_b \omega_g}{F}}$$

where for our purposes

$$\omega_g = \sum_i \frac{1}{n_i} \text{ (i.e. for comparison } \hat{\phi}_{ij} = \bar{Y}_i - \bar{Y}_j, \omega_{ij} = \frac{1}{n_i} + \frac{1}{n_j} \text{)}$$

with n_i = the number in comparison group "i.")

F_{α} = the value required for significance at the α level,
with J-1 and N-J degrees of freedom.

MS_b = mean square between

F = computed F value

¹William L. Hays, Statistics (New York: Holt, Rinehart and Winston, 1963), p. 484.

Defining the comparison value $\phi_{ij} = \bar{Y}_i - \bar{Y}_j$ where $\bar{Y}_i$ is the adjusted post-test mean for treatment "i."

Treatment 3 was the three-week course, treatment 6 the six-week course, and treatment 15 the fifteen-week course. A 95 per cent confidence statement was calculated.

$$-1.06 - 4.59 < \phi_{3,6} < -1.06 + 4.59$$

$$- 5.65 < \phi_{3,6} < 3.53$$

As this confidence interval included zero it must be concluded that there was not a significant difference between the three-week and six-week Intermediate Algebra courses.

$$3.86 - 4.86 < \phi_{3,15} < 3.86 + 4.86$$

$$- 1.00 < \phi_{3,15} < 8.72$$

Again the confidence interval included zero and therefore there is insufficient evidence to state there is a difference in the academic achievement of students taking Intermediate Algebra in three weeks from those taking it in fifteen weeks.

$$4.92 - 4.81 < \phi_{6,15} < 4.92 + 4.81$$

$$0.11 < \phi_{6,15} < 9.73$$

This confidence interval does not include zero and because the difference is positive the conclusion was that the academic achievement of students in the six-week Intermediate Algebra course was superior to that of the students in the fifteen-week course when measured with pre-test and post-test of Co-op Algebra II using Analysis of Covariance.

As a secondary means of testing the hypothesis of no difference in the academic achievement of Intermediate Algebra students the grades in the three-week, six-week, and fifteen-week sections were tested using Analysis of Variance. For computation of Grade Point Average all withdrawals and E grades were considered as 0, D as 1, C as 2, B as 3, and A as 4.

TABLE 4- 9.--Grade point average--Intermediate Algebra.

	GPA	n
3 week	1.91	23
6 week	1.85	20
15 week	1.38	26

TABLE 4-10.--Analysis of variance--Intermediate Algebra
GPA

Between Mean Square	F	Degrees of Freedom	Probability Less Than
2.03	1.08	2 and 66	0.345

This F value is not sufficient to reject the hypothesis of no significant difference in the academic achievement of students taking Intermediate Algebra in three weeks, six weeks, or fifteen weeks based upon their final grade.

College Algebra Achievement

In College Algebra as in Intermediate Algebra the primary means of testing academic achievement was with analysis of covariance using forms A and B of the Cooperative Testing Service--Algebra III for the pre-test and post-test.

Hypothesis:

There will be no differences in mathematics achievement between students taking College Algebra in three weeks, six weeks, or fifteen weeks.

TABLE 4-11.--Pre-test and post-test means--College Algebra

	Pre-test Mean	Post-test Mean	n
3 week	141.92	151.31	13
6 week	141.57	156.64	14
15 week	141.47	151.60	15

TABLE 4-12.--Analysis of covariance--College Algebra

Between Mean Square	F	Degrees of Freedom	Probability Less Than
128.77	2.78	2 and 38	0.075

Here there was not sufficient evidence to reject the hypothesis of no difference in achievement of College Algebra students in three-weeks, six-weeks, or fifteen-weeks courses. It was still interesting to look at the adjusted post-test means.

The raw regression coefficient relating pre-test to post-test scores was only 0.52 which yielded the following adjusted post-test mean:

TABLE 4-13.--Adjusted post-test means--College Algebra

Treatment	Adjusted Post-test Mean
3 week	151.17
6 week	156.69
15 week	151.70

Although the difference is not significant at the 0.05 level, in this study the six-week course produced somewhat better results than the three-week or fifteen-week courses, on the Coop-Algebra III test.

Again analysis of variance on the grades received in the courses was used for supportive data.

TABLE 4-14.--Grade point average--College Algebra

	GPA	n
3 week	1.82	17
6 week	2.43	14
15 week	1.72	22

TABLE 4-15.--Analysis of variance--College Algebra GPA

Between Mean Square	F	Degrees of Freedom	Probability Less Than
2.33	1.39	2 and 50	0.256

Here again the conclusion drawn must be no significant difference in academic achievement as determined by final course grades, but here again, although not significant, the six-week course had a higher grade point average.

Political Science Achievement

Covariance analysis was again the primary method of testing the academic achievement of the student in the course Introduction to American Government, using the pre-test scores as the covariate for the post-test scores. Secondary supportive data on grade point average (GPA) was acquired using analysis of variance on the final course grade.

As there was a significant difference in the ACT Composite scores of students taking Intermediate Algebra from those taking College Algebra, to further analyze the other subjects in the study they will be broken down into sub-groups A and B, with sub-group A being those students who were also enrolled in College Algebra and sub-group B those students who were also enrolled in Intermediate Algebra.

Hypothesis:

Students will achieve equally well taking the course Introduction to American Government in three weeks, six weeks, or fifteen weeks.

TABLE 4-16.--Pre-test and post-test means--Political Science

	Pre-test Mean	Post-test Mean	n
3 week	54.56	74.33	39
6 week	55.78	70.61	36
15 week	51.27	59.68	22

TABLE 4-17.--Analysis of covariance--Political Science

	Between Mean Square	F	Degrees of Freedom	Probability
Total	994.97	16.36	2 and 93	0.000
Group A	900.62	13.57	2 and 50	0.000
Group B	601.78	10.46	2 and 61	0.000

All computed F values were significant so post hoc comparisons were used to determine which treatment was best.

A raw regression coefficient of 0.80 relating pre-test and post-test scores yielded the following adjusted post-test means: (page 54)

Using Scheffé post hoc comparisons to compute 95 per cent confidence intervals for the difference of means:

TABLE 4-18.--Adjusted post-test means--Political Science

Treatment	Adjusted Post-test Mean
3 week	73.78
6 week	69.09
15 week	61.75

$$0.20 < \phi_{3,6} < 9.18$$

$$6.85 < \phi_{3,15} < 17.21$$

$$2.08 < \phi_{6,15} < 12.60$$

None of these confidence intervals include zero so it was concluded by the nature of the differences that the three-week course produced better results academically than the six-week course which in turn was better than the fifteen-week course.

Analysis similar to that performed on the total Political Science group was carried out for sub-groups A and B as sub-group A, or those students who had also been enrolled in College Algebra had been shown superior academically to sub-group B, or those students who had also been enrolled in Intermediate Algebra.

TABLE 4-19.--Pre-test and post-test means--Political Science A

	Pre-test Mean	Post-test Mean	n
3 week	56.81	79.25	16
6 week	57.37	72.31	16
15 week	51.27	59.68	22

With a raw regression coefficient between pre-test and post-test scores of 0.90 the adjusted post-test means are:

TABLE 4-20.--Adjusted post-test means--Political Science A

Treatment	Adjusted Post-test Mean
3 week	77.74
6 week	70.29
15 week	63.20

Computing 95 per cent confidence intervals for the difference of means:

$$0.16 < \phi_{3,6} < 14.74$$

$$7.78 < \phi_{3,15} < 21.32$$

None of these confidence intervals include zero so, as in the total group, this sub-group shows the three-week course produced better academic results than the six-week course which in turn was superior to the fifteen-week course.

Now looking at sub-group B.

TABLE 4-21.--Pre-test and post-test means--Political Science B

	Pre-test Mean	Post-test Mean	n
3 week	53.00	70.91	23
6 week	54.50	69.25	20
15 week	51.27	59.68	22

The raw regression coefficient of 0.64 relating pre-test to post-test scores yields the following adjusted post-test means:

TABLE 4-22.--Adjusted post-test means--Political Science B

Treatment	Adjusted Post-test Mean
3 week	70.86
6 week	68.22
15 week	60.75

Computing 95 per cent confidence intervals for the difference in means:

$$-3.19 < \phi_{3,6} < 8.45$$

$$4.43 < \phi_{3,15} < 15.78$$

$$1.60 < \phi_{6,15} < 13.36$$

Two of these intervals do not include zero so it was concluded that both the three-week and the six-week courses in Political Science B produced better results than the fifteen-week course with respect to the students' academic achievement as determined by analysis of covariance with the pre-test used as the covariate for the post-test.

Testing the same hypothesis of no difference in the students' academic achievement using analysis of variance on the final course grades yielded the following results:

TABLE 4-23.--Grade point average--Political Science

	3 Week		6 Week		15 Week	
	GPA	n	GPA	n	GPA	n
Total	2.23	40	2.34	37	1.36	28
Group A	2.53	17	2.24	18		
Group B	2.00	23	2.41	19		

TABLE 4-24.--Analysis of variance--Political Science GPA

	Between Mean Square	F	Degrees of Freedom	Probability Less Than
Total	8.91	9.08	2 and 102	0.001
A	8.44	7.57	2 and 59	0.001
B	6.59	7.69	2 and 67	0.001

Here again all three F values are significant so post hoc analysis was performed.

Using Scheffé post hoc comparisons to compute 95 per cent confidence intervals for the difference of means for the total group yielded:

$$-0.68 < \phi_{3,6} < 0.44$$

$$0.26 < \phi_{3,15} < 1.48$$

$$0.37 < \phi_{6,15} < 1.51$$

By the nature of the differences it was concluded that the grade point average of both the three-week and six-week courses were superior to the grade point average for the fifteen-week course for the total Political Science group.

Now looking at Group A, who were also enrolled in College Algebra:

$$-0.62 < \phi_{3,6} < 1.20$$

$$0.35 < \phi_{3,15} < 1.99$$

$$0.06 < \phi_{6,15} < 1.71$$

These results are exactly the same as for the total group with both three- and six-week treatment having higher grade point average than fifteen week.

Continuing on to group B, those who were also enrolled in Intermediate Algebra, the 95 per cent confidence intervals are:

$$-1.13 < \phi_{3,6} < 0.31$$

$$-0.01 < \phi_{3,15} < 1.29$$

$$0.36 < \phi_{6,15} < 1.74$$

For this group, only the third comparison has a confidence interval that does not include zero and by the nature of the difference we concluded that the six-week class had a better grade point average than the fifteen-week class.

In summary, academic achievement in Political Science, as determined by pre-test and post-test, showed the three-week course producing better results than the

six-week course which in turn produced better results than the fifteen-week course. This was true for both the total group and the sub-group of students who were also enrolled in College Algebra. For the sub-group consisting of those students who were also enrolled in Intermediate Algebra both the three- and six-week courses produced better results than the fifteen-week course with no significant difference in the results of the three-week and six-week courses.

Using the final course grade as the measure of academic achievement the three- and six-week courses produced higher grade point averages than the fifteen-week course in both the total group and the sub-group that also took College Algebra, with no difference between three- and six-week courses. In the sub-group that also took Intermediate Algebra the only difference had the six-week course with a higher grade point average than the fifteen-week course.

Speech Achievement

The pre-test and post-test for Principles of Public Speaking were instructor constructed instruments consisting of 30 per cent written and 70 per cent oral (speech).

Hypothesis:

Students will achieve equally well taking Principles of Public Speaking in three weeks, six weeks, or fifteen weeks.

TABLE 4-25.--Pre-test and post-test means--Speech

	Total Group			Group A			Group B		
	Pre-test	Post-test	n	Pre-test	Post-test	n	Pre-test	Post-test	n
3 week	74.19	84.72	38	75.37	86.99	15	73.41	83.24	23
6 week	75.40	83.19	34	74.39	81.18	14	76.11	84.59	20
15 week	73.09	84.86	17						

To test the hypothesis, analysis of covariance was applied with the following results:

TABLE 4-26.--Analysis of covariance--Speech

	Between Mean Square	F	Degrees of Freedom	Probability
Total	98.1	3.05	2 and 85	0.053
Group A	115.69	3.39	2 and 42	0.043
Group B	35.53	1.09	2 and 56	0.345

The F values for the total group and for sub-group B are insufficient to claim a significant difference in the academic achievement of students taking speech in three weeks, six weeks, or fifteen weeks. The F value for sub-group A is significant so post hoc procedures were required to see if the direction of the differences could be discerned. It is also of interest to look at the adjusted post-test scores even though there was not enough evidence to reject the null hypothesis.

With raw regression coefficient of 0.90, 0.84, and 0.84 for total, Group A and Group B, respectively, the adjusted post-test means were calculated as:

TABLE 4-27.--Adjusted post-test means--Speech

	Total Group Means	Group A Means	Group B Means
3 week	84.76	86.08	83.90
6 week	82.12	81.09	82.99
15 week	85.88	85.86	85.79

Computation of 95 per cent confidence intervals for the difference of means was done only for Group A as it was the only group with a significant F value.

$$-0.53 < \phi_{3,6} < 10.51$$

$$-5.04 < \phi_{3,15} < 5.46$$

$$-10.13 < \phi_{6,15} < 0.59$$

All of these confidence intervals contain zero so there was insufficient evidence to conclude that any one treatment was better than any other.

Using the final course grades as the measure of academic achievement produced the following results:

(page 62)

The F values found for the total Speech and for Group B are sufficient to reject the hypothesis that

TABLE 4-28.--Grade point average--Speech

	3 Week		6 Week		15 Week	
	GPA	n	GPA	n	GPA	n
Total	3.03	39	3.25	36	2.58	19
Group A	3.19	16	3.27	15		
Group B	2.91	23	3.24	21		

TABLE 4-29.--Analysis of variance--Speech GPA

	Between Mean Square	F	Degrees of Freedom	Probability
Total	2.80	4.32	2 and 90	0.016
Group A	2.49	2.66	2 and 47	0.081
Group B	2.17	3.23	2 and 60	0.047

there was no difference in academic achievement as determined by the final course grade in the three-week, six-week, and fifteen-week Speech courses.

Using Scheffé post hoc procedures to determine 95 per cent confidence intervals for the difference of mean grade point averages yielded the following:

$$-0.69 < \phi_{3,6} < 0.25$$

$$-0.11 < \phi_{3,15} < 1.01$$

$$0.10 < \phi_{6,15} < 1.24$$

As the third confidence interval is the only one that does not include zero, it provided the only

significant difference with the six-week Speech GPA higher than the fifteen-week Speech GPA.

Applying the same procedures to Group B yielded:

$$-0.95 < \phi_{3,6} < 0.29$$

$$-0.31 < \phi_{3,15} < 0.97$$

$$0.01 < \phi_{6,15} < 1.21$$

Here again the only interval not including zero was the third interval. For the Speech B student, or those who were also enrolled in the Intermediate Algebra Course, the grade point average for those students who took the course in six weeks was better than for those who took the course in fifteen weeks. There was no difference in the grade point averages between the students in the three-week course and those in the six-week course, nor was there a difference in the grade point average of the three-week group and the fifteen-week group.

TABLE 4-30.--Grade point average--Speech

	3 Week		6 Week		15 Week	
	GPA	n	GPA	n	GPA	n
Total	3.02	30	3.25	36	2.57	19
Group A	3.18	16	3.26	15		
Group B	2.91	23	3.23	21		

In summary, academic achievement in Speech as determined by pre-test and post-test with analysis of covariance produced no significant differences between the students taking Speech in three weeks, six weeks, or fifteen weeks. This was true for the whole group as well as the subgroup A and B. When academic achievement was determined by means of the final course grade with no allowance made for the initial differences in the entry level between the classes, the six-week course produced a higher grade point average than the fifteen-week course. This difference held true for both the total group and for subgroup B. There were no differences between the different time modes of subgroup A. The grade point average of students in the total group and subgroup B showed no difference between the three- and six-week courses or the three- and fifteen-week courses.

English Achievement

As there were to be four experimental groups along with a control group, a minimum of five sections of Freshmen Composition were required. The usual teaching load at Delta College is 15-16 credit hours per semester, and each of the courses in the project three credit hours. It might be assumed that only one

instructor would be required for the English classes in the Project, but members of the English Division were convinced that it is unrealistic to expect any instructor to teach five sections of Freshman Composition. For this reason two English instructors were involved in the Project. One instructor taught two three-week sessions, one six-week course, and one fifteen-week control group. The other instructor taught one six-week course and one fifteen-week control group along with a couple of other courses not associated with the Project. It was hoped that there would be no difference between the results achieved by these two instructors so that the classes could be pooled for the analysis of English achievement.

As both Professor H and Professor K taught a six-week course and a fifteen-week control group, the most appropriate vehicle for testing the hypothesis of no differences in academic achievement appeared to be a two-way analysis of covariance using the pre-test score as the covariate for the post-test score. The first factor was the number of weeks in the course and the second factor was the instructor teaching the course.

Hypothesis 1:

There will be no differences in academic achievement between students taking English in six weeks and students taking English in fifteen weeks.

Hypothesis 2:

There will be no differences in academic achievement between students taking English from Professor H and those taking English from Professor K.

Hypothesis 3:

The academic achievement of students taking English from Professor H will be the same as those taking English from Professor K regardless of the time mode for instruction.

TABLE 4-31.--Pre-test and post-test means--Two-way English

	6 Weeks		15 Weeks	
	Pre-test	Post-test	Pre-test	Post-test
Professor H	71.11	69.58	62.41	72.12
Professor K	68.93	74.29	57.27	54.27

TABLE 4-32.--Two-way analysis of covariance--English

Effect	Between Mean Square	F	Degrees of Freedom	Probability
Time	25.85	0.24	1 and 56	0.629
Instructor	196.90	1.80	1 and 56	0.185
Time x Instructor	1607.67	14.68	1 and 56	0.00

The F value for the main effect of the number of weeks in the course is not significant. The data provided insufficient evidence to reject the hypothesis that there is no difference between the academic achievement of students taking English in six weeks and those taking it in fifteen weeks.

The F value for the effect of the instructor teaching the class is also not significant, and it must be concluded that students who took Freshman Composition from Professor H did not achieve at a different level than those who took Freshman Composition from Professor K.

When testing for the interaction of time with instructor a significant F value was found and Hypothesis 3 must be rejected, so the students did achieve better from one instructor in six weeks and from the other in fifteen weeks. To further analyze this aspect of the study the following chart was constructed.

TABLE 4-33.--Adjusted post-test means--Two-way English

	6 Weeks	15 Weeks
Professor H	66.38	73.41
Professor K	72.23	58.2

The raw regression coefficient relating pre-test scores to post-test scores is 0.51. By looking at Table 4.33 one must conclude that students achieved better from Professor H in fifteen weeks but they achieved better in six weeks when they took that course from Professor K.

Testing the same three hypotheses when academic achievement was defined in terms of the final course grade yielded:

TABLE 4-34.--Grade point average--Two-way English

	6 Week	15 Week	Total	Standard Deviation	N
Professor H	2.33	1.79	2.07	0.55	39
Professor K	2.43	2.43	2.43	0.69	29

At the chosen significance level the first two of these hypotheses must be rejected. Thus when the final course grade was used as the criterion for assessing academic achievement, the students achieved differently in a six-week course in English than they did

TABLE 4-35.--Analysis of variance--Two-way English GPA

Effect	Between Mean Square	F	Degrees of Freedom	Probability
Time	1.53	4.51	1 and 64	0.038
Instructor	2.28	6.71	1 and 64	0.012
Time x Instructor	1.21	3.55	1 and 64	0.064

in a fifteen-week course, and they achieved differently when they took the course from Professor H than they did when they took the course from Professor K.

It is interesting to note that when the pre-test and post-test were used for determination of academic achievement the fifteen-week course taught by Professor H produced better results than the six-week course, but when the final course grade was used as a measure of academic achievement the six-week course showed better results. Testing the difference of means via the Normal Probability Distribution yielded $Z = 2.29$ which is certainly significant and one must conclude that Professor H gave lower grades than Professor K.

Perhaps looking at the ACT English scores will shed some light on the initial differences in the classes and will explain the difference in grading.

TABLE 4-36.--ACT--English scores

	6 Week	15 Week
Professor H	19.13	17.81
Professor K	20.00	13.00

It appears that although Professor K's fifteen-week class was well below average on the ACT - English score they achieved at almost the identical rate as the six-week class with respect to grade point average.

Although students do achieve differently from Professor H and Professor K on both measures that were used to test academic achievement, the data from both instructors will be used in the analysis that follows as no really justifiable reasons could be found for excluding one or the other of them from the study.

Hypothesis:

Students taking Freshman Composition will achieve equally well academically whether taking the course in three weeks, six weeks, or fifteen weeks.

TABLE 4-37.--Pre-test and post-test means--English

	Total Group			Group A			Group B		
	Pre-test	Post-test	n	Pre-test	Post-test	n	Pre-test	Post-test	n
3 Week	63.58	57.00	31	70.07	61.27	15	57.50	53.00	16
6 Week	70.18	71.58	33	68.93	74.29	14	71.11	69.58	19
15 Week ^a	60.39	65.11	28	57.27	54.27	11	60.39	65.11	28

^aThe control group for Total and Group B consisted of the fifteen-week classes taught by both instructors as both instructors were involved in the teaching of the experimental groups. The control group for Group A was the fifteen-week class taught by Professor K as she was involved in the teaching of the Group A experimental group.

TABLE 4-38.--Analysis of covariance--English

	Between Mean Square	F	Degrees of Freedom	Probability
Total	1138.70	9.74	2 and 88	0.001
Group A	864.29	6.21	2 and 36	0.005
Group B	606.74	4.84	2 and 59	0.011

All three F values are large enough to reject the hypothesis of no difference in academic achievement between the three-, six-, and fifteen-week courses.

With raw regression coefficients of 0.51, 0.46, and 0.49 for Total, Group A, and Group B respectively, the adjusted post-means are:

TABLE 4-39.--Adjusted post-test means--English

	Total Group Means	Group A Means	Group B Means
3 week	57.58	59.1	55.71
6 week	68.78	72.66	65.59
15 week	67.32	58.06	66.39

The 95 per cent confidence intervals for the difference in the adjusted post-test means turn out to be:

$$-17.93 < \phi_{3,6} < -4.47$$

$$-16.76 < \phi_{3,15} < -2.72$$

$$-8.38 < \phi_{6,15} < 5.46$$

The first two confidence intervals do not include zero and the nature of the difference shows the six- and fifteen-week Freshman Composition courses produced better academic achievement than the three-week courses.

The same analysis for English - Group A yielded:

$$-24.78 < \phi_{3,6} < -2.32$$

$$-10.95 < \phi_{3,15} < 13.05$$

$$2.41 < \phi_{6,15} < 26.77$$

The first and third confidence intervals do not include zero and the nature of the differences indicate the six-week course in Freshman Composition for those students who were also enrolled in College Algebra produced better results academically than the three-week course or the fifteen-week course.

The same type of confidence intervals for the English - Group B were:

$$-19.38 < \phi_{3,6} < -0.38$$

$$-19.45 < \phi_{3,15} < -1.91$$

$$-9.13 < \phi_{6,15} < 7.51$$

The first two confidence intervals do not include zero and the nature of the differences shows that for students taking Freshman Composition and also enrolled

in Intermediate Algebra academic achievement is better in both the six- and fifteen-week courses than it is in the three-week course.

Testing the same hypothesis of no differences in the academic achievement of students taking Freshman Composition in three weeks, six weeks, or fifteen weeks using analysis of variance on the final course grades yields the following:

TABLE 4-40.--Grade point average--English

	Total		Group A		Group B	
	GPA	n	GPA	n	GPA	n
3 week	2.63	39	2.59	16	2.65	23
6 week	2.37	34	2.43	14	2.33	20
15 week	2.07	34	2.43	15	2.07	34

TABLE 4-41.--Analysis of variance--English GPA

	Between Mean Square	F	Degrees of Freedom	Probability
Total	2.80	6.39	1 and 104	0.003
Group A	0.14	0.28	2 and 42	0.76
Group B	2.29	5.64	2 and 74	0.005

The F values for the total group and for Group B are large enough to reject the hypothesis of no difference in the GPA of the three treatments.

Scheffé post hoc procedures yield the following 95 per cent confidence intervals for the differences in GPA's for the Total Group:

$$-0.13 < \phi_{3,6} < 0.65$$

$$0.17 < \phi_{3,15} < 0.95$$

$$-0.10 < \phi_{6,15} < 0.70$$

The second interval is the only one not including zero and the direction of the difference enables one to state that the three-week Freshman Composition classes received significantly higher grades than the fifteen-week classes.

The confidence intervals for Group B, those students in Freshman Composition who were also enrolled in Intermediate Algebra are:

$$-0.17 < \phi_{3,6} < 0.81$$

$$0.15 < \phi_{3,15} < 1.01$$

$$-0.19 < \phi_{6,15} < 0.71$$

Here again the second interval is the only one not including zero and the direction of the difference shows that the three-week English B class had a higher grade point than the fifteen-week English class.

In summary, the testing of academic achievement in Freshman Composition produced inconsistent and confusing results.

When academic achievement was determined by means of pre-tests and post-tests, the two-way analysis

of covariance found that the students achieved better from Professor H in fifteen weeks but that they achieved better from Professor K in six weeks. For both the total group and those students who were also enrolled in Intermediate Algebra the six-week and the fifteen-week courses produced higher achievement than the three-week courses. For students who were also enrolled in College Algebra the six-week course produced higher achievement than either the three-week or the fifteen-week courses.

When academic achievement was determined by the final course grade the two-way analysis of variance found that the students of Professor K achieved better than the students of Professor H and the students achieved better in six weeks than in fifteen when they took this course from Professor H. For the total group and for the students who were also enrolled in Intermediate Algebra the grades were significantly higher for the three-week course than they were for the fifteen-week course.

Summary

The first stage in the analysis of academic achievement showed that the students who were enrolled in College Algebra were academically superior overall to those who were enrolled in Intermediate on the basis of ACT composite scores. For this reason further analysis was done on the other courses by breaking

them down into sub-group A or those who were also enrolled in College Algebra, and sub-group B or those who were also enrolled in Intermediate Algebra.

When the pre-test and post-test scores were used to define academic achievement the six-week Intermediate Algebra was superior to the fifteen-week group but there were no differences between the treatments in College Algebra or Speech classes. In Political Science the three-week classes were better than the six-week classes which in turn were better than the fifteen-week class for both the total group and sub-group A, while both the three- and six-week treatments produced better results than the fifteen-week treatment in sub-group B. For Freshman Composition, both the total group and sub-group B found the achievement better in both the six- and fifteen-week course than that of the three-week course, while in sub-group A the six-week class produced better results than either the three- or fifteen-week classes.

When the final course grade was used as the criterion of achievement, both the College Algebra and Intermediate Algebra showed no differences while Speech in six weeks was better than in fifteen weeks for both the total group and sub-group B. The three- and six-week treatments produced better results than the fifteen-week treatment in the total Political Science group and

in sub-group A, while in sub-group B just the six-week course was superior to the fifteen-week course. The two English professors graded considerably differently with the professor that taught English B in six weeks and a fifteen-week class grading more stringently than the one that taught both three-week courses, English A in six weeks, and a fifteen-week course. This partially accounts for the three-week classes producing better achievement than the fifteen-week classes in both the total group and in sub-group B.

Mortality

For the purpose of this study mortality was defined as all those students who either withdrew or received a grade of D or E, and for labeling the subsequent tables they were designated "fail." The analysis of mortality was done via Chi-square contingency tables when appropriate and when the conditions for chi-square were not satisfied the Fisher Exact Test was used.

Fisher Exact Test¹

When a 2 x 3 contingency table has cell frequencies a, b, c, d, e, f with $m = a + b + c$, $n = d + e + f$, $r = a + d$, $s = b + e$, $t = c + f$ and $N = a + b + c + d + e + f$.

¹William L. Hays, Statistics (New York, Chicago, San Francisco, Toronto, London: Holt, Rinehart and Winston, 1963), p. 599.

a	b	c		m
d	e	f		n
r	s	t		N

The probability of getting this arrangement of cell frequencies given the marginal frequencies is:

$$\frac{m! n! r! s! t!}{a! b! c! d! e! f! N!}$$

"One can test the hypothesis that the obtained result is purely a product of chance by taking the probability as the significance level."¹

Intermediate Algebra Mortality

Hypothesis:

There will be no differences in the mortality rate of students taking Intermediate Algebra in three weeks, six weeks, or fifteen weeks.

To test this hypothesis a chi-square contingency table was constructed with the expected cell frequencies enclosed in parentheses.

TABLE 4-42.--Mortality table--Intermediate Algebra

	3 Week	6 Week	15 Week	Total
Pass	15 (13.0)	11 (11.3)	13 (14.7)	39
Fail	8 (10.0)	9 (8.7)	13 (11.3)	30
Total	23	20	26	69

¹Ibid.

The calculated value of chi-square was $\chi^2 = 1.178$ which is not sufficient to reject the hypothesis of no differences in mortality rates of students who took Intermediate Algebra in three weeks, six weeks, or fifteen weeks.

College Algebra Mortality

Hypothesis:

There will be no differences in the mortality rate of students taking College Algebra in three weeks, six weeks, or fifteen weeks.

To test this hypothesis we again constructed a chi-square contingency table with the expected cell frequencies enclosed in parentheses.

TABLE 4-43.--Mortality table--College Algebra

	3 Week	6 Week	15 Week	Total
Pass	9 (11.2)	12 (9.2)	14 (14.5)	35
Fail	8 (5.8)	2 (4.8)	8 (7.5)	18
Total	17	14	22	53

The calculated value of chi-square was $\chi^2 = 3.803$ which is insufficient to reject the hypothesis of no differences in the mortality rate of students who took College Algebra in three weeks, six weeks, or fifteen weeks.

English Mortality

As the Freshman Composition courses were taught by two instructors, the analysis of mortality for English was done in two stages: first a composite mortality study was made and, second, an analysis of mortality by instructor was done.

Hypothesis:

There will be no differences in the mortality rate of students taking Freshman Composition in three weeks, six weeks, or fifteen weeks.

TABLE 4-44.--Mortality table--English

	3 Week	6 Week	15 Week	Total
Pass	39	34	29	102
Fail	0	0	7	7
Total	39	34	36	109

In the above table the conditions for chi-square are violated (i.e., there are cells with expected frequency less than five) so the Fisher Exact Test was used.

$$\frac{102! 7! 39! 34! 36!}{39! 34! 29! 0! 0! 7! 109!} = 0.0002$$

This result is significant and we must conclude there was a difference in mortality rate between students who took Freshman Composition in three weeks, six weeks, and fifteen weeks. Without resorting to post hoc

procedures it was obvious that the mortality rate was much higher in the fifteen-week course than in the three- or six-week courses.

Hypothesis:

There will be no difference in the mortality rate of students taking Freshman Composition from Professor H in six weeks or in fifteen weeks.

TABLE 4-45.--Mortality table--English Professor H

	6 Week	15 Week	Total
Pass	20	14	34
Fail	0	6	6
Total	20	20	40

The Fisher Exact Test was used as the conditions for chi-square were not satisfied.

$$\frac{34! \ 6! \ 20! \ 20!}{20! \ 14! \ 9! \ 6! \ 40!} = 0.010$$

This result was again significant and without delving into post hoc procedures it was obvious by looking at the data that the mortality rate was significantly lower for the students who took Freshman Composition from Professor H in six weeks than for those who took it from him in fifteen weeks.

Hypothesis:

There will be no differences in the mortality rates of students taking Freshman Composition from Professor K in three, six, or fifteen weeks.

TABLE 4-46.--Mortality table--English Professor K

	3 Week	6 Week	15 Week	Total
Pass	39	14	15	68
Fail	0	0	1	1
Total	39	14	16	69

The Fisher Exact Test was again used as the conditions for chi-square were not satisfied.

$$\frac{68! 1! 39! 14! 16!}{39! 14! 15! 0! 0! 1! 69!} = 0.231$$

As the above probability is not less than 0.05 the rejection of the hypothesis of no differences in the mortality rate of students who took Freshman Composition from Professor K in three weeks, six weeks, or fifteen weeks is not justified.

Speech Mortality

Hypothesis:

There will be no differences in the mortality rate of students taking Principles of Public Speaking in three weeks, six weeks, or fifteen weeks.

TABLE 4-47.--Mortality table--Speech

	3 Week	6 Week	15 Week	Total
Pass	39	36	16	91
Fail	0	0	3	3
Total	39	36	19	94

In this table the conditions for chi-square are violated so the Fisher Exact Test was used.

$$\frac{91! \ 3! \ 39! \ 36! \ 19!}{39! \ 36! \ 16! \ 0! \ 0! \ 3! \ 94!} = 0.007$$

This result is sufficient to reject the hypothesis of no difference in mortality rate and by looking at the data it was obvious without post hoc procedures to see that the mortality rate for the fifteen-week speech course was higher than for the three- or six-week speech courses.

TABLE 4-48.--Mortality table--Speech A

	3 Week	6 Week	15 Week	Total
Pass	23	21	16	60
Fail	0	0	3	3
Total	23	21	19	63

Applying the Fisher Exact Test the probability of the obtained results being purely a product of chance was 0.049 and again looking at the data one must conclude that the mortality rate for fifteen weeks was higher than for either three weeks or six-week courses.

The Fisher Exact Test yields a probability of 0.024 for this occurrence being due to chance and the results for Speech B are consistent with those for the

TABLE 4-49.--Mortality table--Speech B

	3 Weeks	6 Weeks	15 Weeks	Total
Pass	23	21	16	60
Fail	0	0	3	3
Total	23	21	19	63

total Speech and Speech A, that is, the mortality rate was lower for both three-week and six-week courses than it was for the fifteen-week courses.

Political Science Mortality

Hypothesis:

There will be no differences in the mortality rate of students taking Introduction to American Government in three weeks, six weeks, or fifteen weeks.

To test the hypothesis we constructed a chi-square contingency table with expected cell frequencies given in parentheses.

TABLE 4-50.--Mortality table--Political Science

	3 Week	6 Week	15 Week	Total
Pass	31 (28.0)	30 (25.9)	14 (21.0)	75
Fail	9 (12.0)	7 (11.1)	16 (9.0)	32
Total	40	37	30	107

As there was $(3-1) (2-1) = 2$ degrees of freedom the critical value of chi-square is $\chi^2 = 5.99$ but by

computation $\chi^2 = 11.01$ which is significant. Now applying post hoc procedures a 95 per cent confidence interval for a difference of proportions was found by the formula.¹

$$\hat{p}_i - \hat{p}_j \pm \sqrt{\chi_{k-1}^2} \sqrt{\frac{\hat{p}_i \hat{q}_i}{n_i} + \frac{\hat{p}_j \hat{q}_j}{n_j}}$$

where:

$\hat{p}_i$ = the sample proportion of "successes" for treatment i.

$\hat{q}_i = 1 - \hat{p}_i$; or the sample proportion of "failures" for treatment i.

n_i = the number of trials or elements in treatment i.

K = the total number of treatments

χ_{k-1}^2 = chi-square variable for 0.05 significance level and $K-1$ degrees of freedom.

$$-0.27 < p_3 - p_6 < 0.19$$

$$0.03 < p_3 - p_6 < 0.59$$

$$0.07 < p_6 - p_{15} < 0.61$$

The last two of these confidence intervals do not include zero so the conclusion drawn was that the mortality rate in Political Science was higher in the fifteen-week course than in the three- or six-week courses.

¹This formula was obtained from the Michigan State University College of Education, Office of Research Consultation and is contained in lecture notes from a seminar on "Non Parametric Statistics" by Dr. Maryellen McSweeney.

TABLE 4-51.--Mortality table--Political Science A

	3 Week	6 Week	15 Week	Total
Pass	15 (10.9)	12 (10.9)	14 (19.2)	41
Fail	2 (6.1)	5 (6.1)	16 (10.8)	23
Total	17	17	30	64

The computed $\chi^2 = 8.52$ exceeded the critical value $\chi^2_0 = 5.99$ so there was a difference in the mortality rates for those students in Political Science who were also enrolled for College Algebra. The 95 per cent confidence intervals for the difference of proportions are:

$$-0.15 < p_3 - p_6 < 0.51$$

$$0.13 < p_3 - p_{15} < 0.71$$

$$-0.11 < p_6 - p_{15} < 0.59$$

For those students who took Political Science and were also enrolled for College Algebra the mortality rate for the fifteen-week course exceeded that of the three-week course, and this was the only significant difference in mortality rates for this group.

TABLE 4-52.--Mortality table--Political Science B

	3 Week	6 Week	15 Week	Total
Pass	16 (15.1)	18 (13.2)	14 (19.7)	48
Fail	7 (7.9)	2 (6.8)	16 (10.3)	25
Total	23	20	30	73

The computed value $\chi^2 = 10.09$ exceeded the critical value $\chi^2_0 = 5.99$ so there was a difference in the mortality rates for Political Science B. Using post hoc procedures to construct 95 per cent confidence intervals for the difference of proportions yielded:

$$-0.49 < p_3 - p_6 < 0.09$$

$$-0.09 < p_3 - p_{15} < 0.55$$

$$0.15 < p_6 - p_{15} < 0.71$$

As only the last interval does not include zero, for the students who were also enrolled in Intermediate Algebra the mortality rate in Political Science was higher in fifteen weeks than it was in the six-week course.

Summary

Except for the mathematics, there was a significant difference in the mortality rates of the three-week, six-week, and fifteen-week courses with the rate of mortality higher in the fifteen-week courses in each case.

Student Evaluation of Instruction

In order to provide the students involved with the project an outlet for their opinions and a vehicle for evaluation of their teachers and the courses the

"Student Evaluation of Instruction" form (Appendix) that is used college wide at Delta College was distributed for the students to complete during the last couple days of each class. This form was supplemented with several open-ended questions aimed specifically at evaluation of the project. The last question in the supplemental section asked the student's preference as to treatment: Would they prefer taking this particular course in three weeks, six weeks, or fifteen weeks? The scoring on the regular evaluation form ran from one to nine with one being the best possible score. The form was sub-divided into four categories for the purpose of this study.

1. Attitudes

- (a) Instructor's enthusiasm for the subject
- (b) Attitude toward students
- (c) Attitude toward differences of opinion
- (d) Sense of humor
- (e) Willingness to help students and be available for help

2. Teaching Skills

- (a) Knowledge of the subject
- (b) Teaching skill
- (c) Explanations, answers to questions
- (d) Poise and self-confidence

3. Management or Course Organization

- (a) Organization of the course
- (b) Assignments
- (c) Examination questions
- (d) Method of grading

4. General

- (a) Enjoyment of the course
- (b) Rating of the instructor as compared
with others

Since these four evaluation categories were not independent and would violate the independence assumptions of a two-way analysis of variance, a multi-variate analysis of variance was used for this aspect of the study. The assumption of homogeneity of student attitudes before treatment was made. Each course was analyzed separately.

Student Evaluation of Speech

The first phase of analyzing the student evaluation was to find the per question average for each of the four categories for the three-week courses, six-week courses, and fifteen-week courses.

Hypothesis:

There will be no difference in the student's evaluation of the three-week, six-week, and fifteen-week Speech courses.

TABLE 4-53.--Means--Student evaluation of Speech

	Attitude	Skills	Management	General	n
3 week	1.55	1.77	1.85	1.45	39
6 week	1.72	1.81	1.94	1.93	36
15 week	1.95	2.46	1.71	2.03	17

A multivariate test of equality of the mean vectors gives an F-ratio of 2.698 and with 8 and 172 degrees of freedom the probability of obtaining this value by chance is less than 0.008. Thus, there was a difference in the students' evaluation for the three-week, six-week, and fifteen-week Speech courses. To find where these differences occurred each evaluation category was analyzed separately and where the univariate F was large enough to be significant, the direction of the difference was determined by Scheffé post hoc comparisons.

TABLE 4-54.--Student evaluation--Speech

Variable	Between Mean Square	Univariate F	Probability
Attitudes	24.88	2.26	0.109
Skills	49.85	4.78	0.010
Management	4.97	0.47	0.127
General	12.08	2.11	0.127

(2 and 89 degrees of freedom)

Only the Skills category produced an F-ratio that is sufficient to reject the hypothesis of no difference

in the students' evaluation of Speech. Using Scheffé post hoc comparisons, 95 per cent confidence intervals were calculated for the difference¹ in total category means, in this case Skills.

$$-2.01 < \phi_{3,6} < 1.71$$

$$-5.09 < \phi_{3,15} < -0.41$$

$$-4.97 < \phi_{6,15} < -0.23$$

Both the second and third confidence interval do not include zero so one must conclude by the direction of the differences that the students rated the teaching skills in both the three-week and six-week Speech courses better than they did in the fifteen-week course.

The supplemental questions designed to let the students air their opinions about the project with respect to the course, instructor, time of the course and its intensity as well as anything else the student liked or disliked did not shed too much light as to the differences in the three-, six-, and fifteen-week Speech courses. Practically all the students thought everything was excellent as witnessed by one student's comment, "The Speech course would have been great no matter what the length of time as long as Professor H taught it!"

¹ ϕ_{ij} is the difference between the means of the i^{th} and j^{th} treatment.

Looking at the Student Evaluation averages it must be noted that this instructor rates very high in the eyes of her students.

Time Preference--Speech

The last question on the Supplemental Student Evaluation of Instruction form asked whether the student would prefer taking the course in three weeks, six weeks, or fifteen weeks.

Hypothesis:

Students' preference for taking Speech in three weeks, six weeks, or fifteen weeks will be the same.

The question pertaining to the time-frame preference of the students taking Speech yielded these results:

TABLE 4-55.--Time preference--Speech

Treatment	Preference			Total
	3 Weeks	6 Weeks	15 Weeks	
3 week	25 (11.9)	9 (18.2)	2 (5.9)	36
6 week	1 (11.2)	30 (17.2)	3 (5.6)	34
15 week	4 (6.9)	7 (10.6)	10 (3.5)	21
Total	30	46	15	91

The numbers in parentheses are the expected cell frequencies for this chi-square contingency table. The calculated value of chi-square $\chi^2 = 56.18$ greatly exceeds

the critical value $\chi^2_0 = 9.49$ so there was a difference in the student preference. Looking at just the last row of Table 4.55 or those students who had Speech in fifteen weeks and applying a chi-square test gave a calculated value $\chi^2 = 2.59$ where the critical value $\chi^2_0 = 5.99$ so for these students, their preference for Speech in three weeks, six weeks, or fifteen weeks was not significantly different. Ordinarily, as would be expected, the students did prefer the particular time mode they happened to have taken, i.e., those that took the three-week Speech course preferred the three-week course.

Student Comments

Some typical comments from students that took Speech in three weeks are: "Lets you concentrate on one subject." "Great for Speech--but would be horrible for Science." "I worry about being absent for even one day." "I'm afraid math would be bad." Only two students commented negatively about the course or instructor whereas thirty-four commented favorably.

The six-week people commented: " . . . never dragged, but never felt rushed." "Three weeks would be too crammed and fifteen weeks would be boring." "You can concentrate on only two subjects." "Knowing the students in the class made giving speeches easier." "You're not bored with one instructor." "You have

time to study." "Fifteen weeks is too drawn out." The ratio of favorable to unfavorable comments made by the six-week students was 32:2.

Those taking the fifteen-week course made these observations: "With more courses you have the opportunity to meet more people." "You avoid boredom with a variety of courses." Four students made no comments about the course or instructor, and only one of those commenting made a negative response.

Student Evaluation of English

Unfortunately, one of the English instructors "forgot" to give the Student Evaluation of Instruction to his class, so the data that follows is for one of the teachers only.

TABLE 4-56.--Means--Student evaluation English

	Attitudes	Skills	Management	General	n
3 week	2.02	2.69	2.69	2.93	40
6 week	1.58	2.08	2.27	1.25	12
15 week	1.52	1.98	2.03	2.15	10

Hypothesis:

There will be no difference in the students' evaluation of the three-week, six-week, and fifteen-week English courses.

The F-ratio for the multivariate test for the equality of mean vectors is $F = 2.431$ and with 8 and

112 degrees of freedom the probability of obtaining such an F-ratio by chance is less than 0.018 so there was a difference in the students' evaluation of the three-week, six-week, and fifteen-week English courses.

TABLE 4-57.--Student evaluation--English

Variable	Between Mean Square	Univariate F	Probability
Attitudes	39.54	3.22	0.047
Skills	49.92	2.85	0.06
Management	34.34	2.46	0.09
General	54.32	7.70	0.001

(2 and 59 degrees of freedom)

Both the Attitudes and General categories have F-ratios sufficient to reject the hypothesis of no difference in the three treatments so 95 per cent confidence intervals were required to determine which treatment was superior. First, the intervals for Attitudes were constructed:

$$-0.68 < \phi_{3,6} < 5.10$$

$$-0.58 < \phi_{3,15} < 5.64$$

$$-3.44 < \phi_{6,15} < 4.08$$

All of the confidence intervals include zero so there is not enough evidence to say that any one treatment

was better than any other as far as the evaluation of the Attitudes category.

Next the intervals for the differences in the General category were constructed.

$$0.16 < \phi_{3,6} < 4.54$$

$$-0.81 < \phi_{3,15} < 3.91$$

$$-4.65 < \phi_{6,15} < 1.05$$

Only the first interval does not include zero and the nature of the difference determines that the General evaluation of the six-week English class was better than the three-week classes.

Time Preference--English

In an attempt to determine if the students perceived either the three-, six-, or fifteen-week courses more appropriate than the others for Freshman Composition a chi-square contingency table (3 x 3) was constructed and the following hypothesis tested:

Hypothesis:

Students' preference for taking Freshman Composition in three weeks, six weeks, or fifteen weeks will be the same.

The numbers in parentheses are again the expected cell frequencies for a chi-square contingency table.

The calculated value of chi-square $\chi^2 = 43.35$ exceeded

TABLE 4-58.--Time preference--English

Treatment	Preference			Total
	3 Week	6 Week	15 Week	
3 week	17 (10.0)	18 (20.8)	2 (6.2)	37
6 week	1 (8.9)	30 (18.6)	2 (5.5)	33
15 week	8 (7.0)	6 (14.6)	12 (4.3)	26
Total	26	54	16	96

the critical value $\chi^2_0 = 9.49$ in this case as well so the students did not prefer to take Freshman Composition in three weeks, six weeks, and fifteen weeks with equal degree of preference. Looking again at the last row in the table, which is the preference for those students who took Freshman Composition in fifteen weeks, under the assumption of equal preference for three-, six-, and fifteen-week courses, the critical value for chi-square would be $\chi^2_0 = 5.99$ but the calculated value was only $\chi^2 = 2.15$. Thus there was not a significant difference in the preference of the students who had Freshman Composition in fifteen weeks. The students who took the course in three weeks appear to be equally divided on their preference between the three-week and the six-week course, but definitely do not want the fifteen. The six-week people seemed to prefer the six-week course.

Student Comments

Some comments from the students taking Freshman Composition in three weeks were: "Can concentrate

better." "I don't have to worry about another thing in school except that one class." "Prefer 6--the 3 week is too intense." "Prefer 6--lessens the monotony of 3." "You get the class over with." "If I ever got a really great class that I was interested in I could get into it and learn." "Home work and tests do not interfere with other classes." The ratio of favorable to unfavorable comments was 32:5.

The six-week people commented: "I don't care for English and it made it more enjoyable to have it for a short time." "For English, fifteen weeks is better because it takes time to develop writing skills." "Two subjects give you enough diversity plus time to study." "The time went too fast in this class, I'm sorry it was over so soon." "I would recommend that the students be screened to eliminate slow students." Of the fourteen students making comments only one was negative.

Some observations of students taking English in fifteen weeks were: "The mind is open to more if more variety is at hand." "You learn more by not rushing through the course." "With a three-week course I think I could put more time into one subject and get more out of it." There were eight people who made favorable comments and two that made negative comments.

Student Evaluation of
Political Science

Analysis of the Student Evaluation of Instruction form yielded the following per question averages:

TABLE 4-59.--Means--Student evaluation of Political Science

	Attitudes	Skills	Management	General	n
3 week	2.68	2.90	2.60	4.03	39
6 week	2.63	2.68	2.07	3.75	30
15 week	2.54	2.97	1.88	3.61	19

Hypothesis:

There will be no difference in the students' evaluation of the three-week, six-week, and fifteen-week course in Introduction to American Government.

Testing the hypothesis using multivariate analysis of variance gave an F-ratio of $F = 1.625$ which with 8 and 164 degrees of freedom has the probability of being due to chance less than 0.121 which is insufficient to reject the hypothesis of no difference in the students' evaluation of the three-week, six-week, and fifteen-week Government courses.

Time Preference--Political
Science

In order to determine if the students felt the three-week, six-week, or fifteen-week treatment was more conducive to the study of Political Science a contingency table was constructed and the following hypothesis tested:

Hypothesis:

Students' preference for taking American Government in three weeks, six weeks, or fifteen weeks will be the same.

TABLE 4-60.--Time preference--Political Science

Treatment	3 Week	6 Week	15 Week	Total
3 week	30 (15.6)	6 (14.7)	1 (6.7)	37
6 week	2 (13.5)	25 (12.7)	5 (5.8)	32
15 week	5 (8.0)	4 (7.6)	10 (3.5)	19
Total	37	35	16	88

The expected cell frequencies for this chi-square contingency table are again the numbers in parentheses. The critical value of chi-square with four degrees of freedom is $\chi^2_0 = 9.49$ so the calculated value $\chi^2 = 60.01$ was more than sufficient to reject the hypothesis of no difference in the time preference of the students who took American Government in three weeks, six weeks, and fifteen weeks. It appears that the students that had Political Science in three weeks preferred it in three weeks while those that had it in six weeks preferred it in six weeks. The students that took the course in fifteen weeks were not quite so polarized and testing these students on their preference yielded a chi-square of $\chi^2 = 3.28$, when the critical value $\chi^2_0 = 5.99$ with two degrees of freedom. Thus one must conclude there was not a significant difference in the preference for a course

in three weeks, six weeks, or fifteen weeks for those students who took the Government course in fifteen weeks.

Student Comments

General comments made by students in the three-, six-, and fifteen-week courses ran in this vein. "The subject matter is uninteresting or distasteful. It's not the teacher's fault--just a hard subject to teach." "The lectures were dull and boring--should have had more discussion."

The students in the three-week courses commented: "My grades have really jumped compared to high school. I also had a better attitude toward studying. I felt like studying 2-4 hours per day knowing I only had one subject to worry about." "It's harder to be bored. The class is over before you know it if you don't like it." "You get bored taking the same subject every day." "Exams are not all taken at the same time." "Even I can put up with a subject for three weeks!" "Because it is so condensed you want to attend every day. If you miss a day you miss an awful lot." "With more classes the less favorite subjects are ignored." "I am normally bored in Government, but in three weeks I wasn't." Only five of the thirty-seven students made any negative comments.

Students who took American Government in six weeks had this to say: "Just right." "Gives adequate time to study and prepare work--doesn't go by too fast nor too slow." "Even though six weeks is a little brief, I would probably have been bored with the course altogether if I had it for fifteen weeks." The ratio of favorable to unfavorable comments was 29:3.

The people who took the course in fifteen weeks commented: "Don't think I could take more than an hour of this stuff each day." "Different subjects keep you a bit more awake." "I would put more into a three-week class." "Prefer three weeks to get it out of the way!" Five students made negative comments compared to fourteen with favorable comments.

Student Evaluation of College Algebra

Preliminary analysis of the student evaluation of College Algebra was accomplished by computing the per question average for each of the categories: Attitudes, Skills, Management, and General for the three-week, six-week, and fifteen-week courses.

TABLE 4-61.--Means--Student evaluation of College Algebra

	Attitudes	Skills	Management	General	n
3 week	4.09	4.19	3.52	6.38	13
6 week	3.48	4.75	3.19	5.04	12
15 week	2.00	2.73	2.79	3.29	12

Using multivariate analysis of variance an attempt was made to determine if there were any differences in the students' evaluation of College Algebra in three weeks vs. fifteen weeks, six weeks vs. fifteen weeks, and three weeks vs. six weeks.

Hypothesis:

There will be no differences in the students' evaluation of the three-week, six-week, and fifteen-week College Algebra courses.

With 8 and 62 degrees of freedom the probability of the obtained F-ratio of $F = 6.681$ being due to chance is less than 0.0001 so the hypothesis of no difference in the students' evaluation of the three-week, six-week, and fifteen-week College Algebra must be rejected. Further analysis was necessary to determine where these differences occurred.

TABLE 4-62.--Student evaluation--College Algebra

Variable	Between Mean Square	Univariate F	Probability
Attitudes	357.30	15.65	0.001
Skills	209.84	7.46	0.002
Management	26.44	1.33	0.276
General	119.71	9.64	0.001

The treatments for College Algebra were different with respect to the students' evaluation in the

three categories Attitudes, Skills, and General. First, construction of confidence intervals for the Attitudes category yielded.

$$-1.86 < \phi_{3,6} < 7.94$$

$$5.56 < \phi_{3,15} < 15.36$$

$$2.42 < \phi_{6,15} < 12.42$$

The last two intervals do not include zero and from the nature of the differences one must conclude that the students rated the instructor better in the fifteen-week College Algebra course than they did in the three-week or six-week course on the Attitude category.

Next, the confidence interval for the difference in Skills means were constructed.

$$-7.67 < \phi_{3,6} < 3.21$$

$$0.42 < \phi_{3,15} < 11.28$$

$$2.54 < \phi_{6,15} < 13.62$$

Here again the last two intervals do not include zero and the fact that they are both always positive enables one to conclude that the Teaching Skills in the fifteen-week College Algebra course were rated superior to those in both the three-week and six-week courses.

Lastly, the General category confidence intervals for difference of means were constructed.

$$-0.92 < \phi_{3,6} < 6.30$$

$$2.58 < \phi_{3,15} < 9.80$$

$$-0.18 < \phi_{6,15} < 7.18$$

Only the second interval does not include zero and it was concluded that from the students' evaluation of the General category the fifteen-week College Algebra course was rated superior to the three-week course.

In each case where differences occurred in the students' evaluation of College Algebra the ratings favored the fifteen-week class over the three-week class, the six-week class or both. This might be explained partially by the fact that the students in the three- and six-week classes were comparing the instructor with other instructors teaching in the project, two of which received extremely good evaluations; whereas the students in the fifteen-week course were comparing the instructor with many other Delta College instructors. While the mathematics instructor rates quite well when compared to the entire Delta College faculty, comparison with other teachers in the project was not nearly as favorable.

Time Preference--College
Algebra

A contingency table was again constructed to determine if the students see College Algebra being taught better in three weeks, six weeks, or fifteen weeks.

Hypothesis:

Students preference for taking College Algebra in three weeks, six weeks, or fifteen weeks will be the same.

TABLE 4-63.--Time preference--College Algebra

Treatment	3 Week	6 Week	15 Week	Total
3 week	8	6	2	16
6 week	0	8	2	10
15 week	3	3	5	11
Total	11	17	9	37

As there were too many cells whose expected frequency would be less than five the chi-square distribution could not be used so the Fisher Exact Test was applied.

$$\frac{16! 10! 11! 11! 17! 9!}{8! 6! 2! 8! 2! 3! 5! 37!} = 0.000$$

The probability of this occurrence being due to chance is so small that one must conclude that the students taking the course in three, six, and fifteen weeks did have different time preferences for taking

College Algebra. The people who took College Algebra in three weeks were about equally divided as to if they prefer the course in the three weeks or in a longer period of time. The people who took the course in six weeks definitely prefer the six-week course and the people who took the course in fifteen weeks were about equally divided as to preference for the three-week, six-week, and fifteen-week courses.

Student Comments

The students in the three-week College Algebra were extremely outspoken and frank to the point of being brutal. Some comments about the instructor were: "Strange (straight)." "Too sweet." "Phoney." "Treated us as if we were 3rd graders." Their views on the course included: "Take math in 6 or 15--others not too difficult in 3." "Homework was impossible to get done." "Subject covered too fast." "Six weeks would be fast enough to be interesting but still be able to get it. Three weeks for math was too much." Twelve of the fourteen students responding made negative comments.

From those taking the course in six weeks was heard: " . . . treated like children." "If you get behind it's worse." "No six-week math course because there is just too much to comprehend in too short of a

time." "Faster and done quick enough you can stick anything out." The ratio of positive to negative comments was 7:4.

The students taking the course in fifteen weeks observed "The instructor does a very good job and tried to help me as much as she could." "Disliked the book. I had to learn concepts and methods in lecture." "Fifteen weeks stretches the learning out and not so much is done at one time." "Six weeks allows more concentration into specific areas. Great idea!" "In three weeks I could do better because I wouldn't have a variety of courses to deal with." All the students commented favorably on the course and instructor.

Student Evaluation of Intermediate Algebra

As with the other subjects the initial analysis of the students' evaluation of Intermediate Algebra was that of calculating the per question mean for each of the four categories of Attitudes, Skills, Management, and General for each of the three treatments of three weeks, six weeks, and fifteen weeks.

TABLE 4-64.--Means--Student evaluation of Intermediate Algebra

	Attitudes	Skills	Management	General	n
3 week	3.32	3.06	2.88	3.88	17
6 week	2.54	3.02	3.25	3.76	17
15 week	2.17	2.15	2.56	3.19	13

With multivariate analysis of variance an attempt was made to determine whether differences existed between the students' overall evaluation of Intermediate Algebra in three weeks vs. fifteen weeks, six weeks vs. fifteen weeks, and three weeks vs. six weeks.

Hypothesis:

There will be no differences in the students' evaluation of the three weeks, six weeks, and fifteen weeks Intermediate Algebra courses.

The F-ratio for the multivariate test of equality of the mean vectors was $F = 2.801$ where with 8 and 82 degrees of freedom the probability of getting this F-ratio by chance is less than 0.008 so one must reject the hypothesis of no difference in the students' evaluation of the three-, six-, and fifteen-week Intermediate Algebra and proceed to univariate analysis to determine where the differences occurred.

TABLE 4-65.--Student evaluation--Intermediate Algebra

Variable	Between Mean Square	Univariate F	Probability
Attitudes	131.98	4.32	0.019
Skills	59.68	2.96	0.062
Management	28.64	0.99	0.376
Overall	7.72	0.55	0.578

(2 and 44 degrees of freedom)

Only the Attitudes category has an F-value sufficient to say there was a difference between the three-, six-, and fifteen-week students' evaluation of Intermediate Algebra. The 95 per cent confidence intervals for the differences in Attitude means were constructed.

$$-0.93 < \phi_{3,6} < 8.69$$

$$0.57 < \phi_{3,15} < 10.91$$

$$-3.31 < \phi_{6,15} < 7.03$$

The second difference is always positive and so one must conclude that the students rated the Attitude category lower in the three-week course than they did in the fifteen-week course.

Time Preference--Intermediate Algebra

The students' response to the question of whether they preferred Intermediate Algebra in three weeks, six weeks, or fifteen weeks resulted in the following:

TABLE 4-66.--Time preference--Intermediate Algebra

Treatment	Preference			Total
	3 Week	6 Week	15 Week	
3 week	4	11	1	16
6 week	1	15	4	20
15 week	3	1	6	10
Total	8	27	11	46

Hypothesis:

Students' preference for taking Intermediate Algebra in three weeks, six weeks, or fifteen weeks will be the same.

Again there are too many cells with expected frequency less than five so the Fisher Exact Test was used instead of the Chi-square. The resultant probability of this arrangement being due to chance is 0.00009 and one must reject the hypothesis that the students' preference for taking Intermediate Algebra in three weeks, six weeks, or fifteen weeks was the same. It appears that both those that had the algebra in six weeks and in three weeks think they would prefer taking the course in six weeks.

Student Comments

The large majority of the students in Intermediate Algebra thought the instructor was very good and a large number of them commented on her interest in them as individuals and her willingness to help outside of class and her patience. These comments are quite different than those made by the more advanced College Algebra students who thought the instructor should be teaching elementary school--that she treated them as children.

The students who took Intermediate Algebra in three weeks seemed to be quite uniform in their evaluation

of the course as witnessed by these comments: "Won't work in a three-week period with average students."

"Math requires more time because there is too much new stuff to learn and you just fly right through it."

"Math should last longer as it takes time to digest the material." "I don't really like math but this class was hell! Went much too fast." "I used to like three-week courses but now I think six would be better." Six of the seventeen students making comments were negative about the course or instructor.

The six-week people had more mixed reactions.

"Instructor tried too hard--bored the class with little things." "It just went too fast!" "Wasn't rushed--didn't feel at all pressured with too many subjects."

"Too much material was crammed into a too short of time."

"Six weeks gives me more time to study. I can devote more time to the classes I have the most trouble in."

"This project works terrific on everything except Algebra." The ratio of favorable to unfavorable comments was 15:4.

The people who took Algebra in fifteen weeks tended to make fewer comments with some of those made as follows: "Fifteen weeks gives you time to make up for bad grades." "Chose fifteen because it breaks things down and isn't so condensed. You have time to work on and finish homework, and study." "Choose

six because once we start studying it seems much easier if there are less days between meetings." Eight of the nine students responding thought the fifteen-week course was fine.

Summary

When analyzing the Student Evaluation of Instruction one finds that, except for College Algebra, any differences that existed between the three-week, six-week, and fifteen-week groups were minimal. In Speech, both the three-week and six-week students rated the instructor's teaching skills better than did the fifteen-week students. In English, the General category was rated lower by the three-week group than by the six-week group. Political Science showed no differences, and in Intermediate Algebra the fifteen-week class rated the instructor better in the Attitude category than did the three-week group. College Algebra was the course in which the most notable differences occurred. In both the Attitudes and Skills categories the fifteen-week class rated the instructor better than did either the three-week or six-week classes. The General category found the fifteen-week class rated better than the three-week class. The reason for these differences might be partially explained by the fact that the instructor was being compared to a large number of Delta College

faculty by the fifteen-week class, but to only the other "project" instructors, where the comparison was not quite so favorable, by the three- and six-week classes.

Time Preference

After each course the students were asked if they would prefer taking their classes: (1) sequentially, one at a time, with each class meeting 15 hours per week for three weeks; (2) two at a time, with each class meeting 7-8 hours per week for about six weeks; or (3) four or five at a time with each course meeting 3 hours per week for the fifteen-week semester. The students, when stating their preference at this time, had only been exposed to one type of time mode and seemed to prefer the time mode they were in. One semester later, the students were again polled, this time by mailed ballot, to see if their opinions of the project or their time preferences had changed. Forty-two of the seventy-three students on the project responded.

TABLE 4-67.--Time preference--One semester later

Treatment	Preference			Total
	3 Week	6 Week	15 Week	
3 week	12	4	5	21
6 week	2	15	4	21
Total	14	19	9	42

Hypothesis:

There will be no difference in the students' preference for the three-week, six-week, or fifteen-week time mode.

Once again the Fisher Exact Test was applied to the data with the resultant probability of this outcome being due to chance calculated to be 0.00008. This result is certainly significant and the hypothesis of no difference in time preference is rejected. Observing the data one sees that although they had been exposed to the regular fifteen-week semester courses they still preferred the time mode they had in the project.

Student Comments

To see how the students viewed the project in retrospect after having a one-semester time lapse to moderate their opinions, they were again asked to comment on the project with respect to the subject matter, instructors, intensity, and anything else they would like to comment on. The students seemed to have established their positions more firmly and did not hesitate to express them.

With about half of the students responding to the "One Semester Later" Questionnaire, only two--one from the three-week and one from the six-week treatments--were negative about the project. Some had negative comments about certain aspects of the project but

their overall assessment was definitely positive, with any criticism intended to be constructive.

Comments from the people who had taken the three-week courses included: "The subjects fit well in the three weeks with exception of math which might be too much for some students. The math teacher didn't seem to be able to communicate well with the students about math or in other ways." "The classes seemed to go by faster and they were more interesting. I always came to class prepared." "A wider choice of courses should be offered." "The math teacher is not cut out for a sequential course project." "I found that you got along with those (students) you liked just fine, but those you disliked really got on your nerves." "I believe the six-week system is best because it increases the intensity of a class over the fifteen weeks, but breaks the monotony which occurs during a three-week class." "If you didn't like a course it was a great way to get it over with fast instead of putting up with it all semester." "The three week is easier but a good deal more boring."

The student who had taken the six-week courses commented: "I felt that I had less free time with the study than I do now." "I didn't like the way the work and exams piled up at the end of the regular semester." "Intensity for math is too much." "English was too

rushed." "People in our group became close friends."
 "Liked the friendship that developed within the class
 due to the closeness of having a common factor to share."
 "Received more individual attention from the teachers
 in the six-week program." "You tend to work harder as
 your goal seemed nearer." "During the fifteen weeks the
 course seemed to drag." "The classes never became
 boring and neither did the instructors. In the fifteen
 weeks this semester the 2nd half of it my grades and
 interest in the course have gone down." "I enjoyed
 everything about the project with the exception of
 algebra which was a little hard to handle in six weeks."
 "Classes like Western Civilization, Algebra, or Biology
 should be taken in fifteen weeks--others such as English
 or Speech can be taken in six weeks."

In general, the students seemed to like the
 project, but there is always the dissenting voice.
 Some of the more printable excerpts from our most out-
 spoken critic are: "This program screwed me because in
 it you didn't have to study as hard to get decent grades
 and wasn't even anything like college, was more like
 some kind of _____ high school. It was not even
 representative of what was to come later. I hated this
 program."

Other negative comments intended to be con-
 structive criticism included: "There was a lack of

total identification with the college itself. We were like an island in a huge ocean." "I think it is important that the instructors and the students do this type of arrangement voluntarily. Many are not suited for intensified study." "Three- and six-week courses are good if the student can select the courses he wants to take--not have them selected for him." "Everyone went out of their way to make it a success--perhaps more than would be done under normal circumstances."

To finish in a positive vein, we end with the following quote: "I thought the project was great! It's too bad all of the classes aren't based on that type of system."

Instructors' Opinion

As only five instructors were involved with the teaching aspects of this study it was felt that a subjective evaluation of the three approaches to learning was the most appropriate tool for evaluation.

The evaluation was done by means of a nine-question Instructor Questionnaire, with each question being considered individually. The answers designated by the discipline of the respondent except in English where further identification was required because of using two instructors. Those responses designated English K are from the instructor who taught the

three-week classes as well as a six-week and a fifteen-week class. Those responses designated English H were made by the instructor who taught only a six-week class along with a fifteen-week control group.

1. Which of the three treatments (three-week, six-week, or fifteen-week) did you like the best? Why? The least? Why?

Mathematics

I liked the fifteen-week treatment best and the three-week treatment least. In a six-week course and more so in a three-week course, (a) students did not have enough time to absorb material, (b) since the understanding of new material (in mathematics) depends greatly on what has already been learned, students were seriously handicapped if they:

- (1) Did not complete an assignment on time
- (2) Were absent
- (3) Were discouraged by a poor test grade and paid less attention to class discussion and homework

(c) Testing presented problems. I did not want to introduce new material and test the students on the new material all in the same day. On the other hand, I did not care to present new material and test on different material. However, this latter alternative can be used without too much difficulty. (d) The course could not be as flexible. The instructor did not have the time to consider major changes in plans. In the three-week course there was no time to think of different ways of reaching a student with special needs whether he be bright or slow. (e) Mathematics tended to appear more mechanical. (f) Students were under great pressure to do well.

Speech

Of the three treatments (three-week, six-week, and fifteen-week) I preferred either the three or six week with a special preference for the three-week course for the teaching of the basic speech course.

The concentration of time and effort in a three-week period is effective, but there is a disadvantage if there is loss of time for bad weather, illness, etc.

I liked the fifteen-week course least because there is too much time between class meetings and concentrated time meant better understanding on the part of the students as to the direction and goals of the course. In a fifteen-week course, students have many courses and assignments on their minds and it seems more difficult for them to achieve perfection in their speaking as they often did in the three- and six-week courses.

Political Science

There appears to be advantages and disadvantages for both the student and instructor in all three of the treatments. Nevertheless for the introductory course in political science, which most students take because it is required, the three-week sessions appear to be best from the instructor's point of view. It allows the instructor the opportunity to know his students better--their backgrounds, interests, and capabilities. This knowledge plus the fact that there are few other distractions makes it possible to tailor the course more nearly to the student's likes and needs. This advantage is somewhat offset by the fact that there is very little time between sessions in which to prepare but on the whole it is a favorable feature of the three-week program. Another advantage is that there seems to be more continuity in the courses. The relationship between facts and concepts presented in the beginning of the course and those at the end are not lost because of the time span as they are in a fifteen-week semester. Finally in the three-week session the boredom of repeating the same material to four or five different sections at the same time is eliminated.

English K

I liked the six-week course the best. The daily student contact gave increased and improved student exposure and allowed for better course continuity. For English composition the six-week treatment seemed to be paced about right. This will become more apparent from the answers to the later questions.

I liked the three-week course the least. I had to change too many of my techniques and leave out at least two concepts which I feel belong in the introductory course in English. Also the fast pace required too much in performance and attitude on both my and the student's part. A let-down day which is normal to both instructor and student was in fact a loss of a week. This is also covered in more detail later.

English H

I enjoyed teaching the six-week course more than the fifteen-week course for the following reasons:

- A. The attitude of the students in the six-week course was better than the attitude of the students in the fifteen-week course. This could be accounted for by the fact that the six-week course students knew the project was experimental and thus chose to take it because they enjoyed the challenge. Also they could have chosen it because they knew that in six weeks the course would be over. An additional factor could have been that the students who selected the six-week course were better prepared for English Composition than those who were in the fifteen-week course, this in spite of the attempt to have both groups composed of randomly selected students.
- B. The students became a group who worked together. This might have been because they saw themselves as special--set apart from other students taking Freshman Composition. It undoubtedly was also because they were together in other classes, something that did not happen for the students in the fifteen-week course.
- C. I enjoyed meeting with the students for two periods every day. This made it possible for me to get to know them and to discover what areas they needed the most help in more quickly.
- D. It was easier for me to carry over from one day to the next day material that had not been fully covered or explored the previous day. There was less time for both the students and the instructor to forget what had happened the previous class session.

I liked the fifteen-week course less than the six-week course because:

- A. The students were less well prepared for college level work, and I had to spend more of my time attempting to motivating the students than in dealing with the concepts of both subject matter and techniques--largely unsuccessfully.
- B. After about eight weeks both the students and the instructor tend to become bored with the routine no matter how interesting the subject matter under discussion is.

Advantages of the fifteen-week course over the six-week course:

- A. It allows more time for students to write papers, and since writing of compositions is learned through the act of writing and clear thinking, some amount of time (for some students this involves from ten to fifteen hours) is necessary for the student to learn this process.
- B. Papers could be corrected and handed back before new papers were assigned. This made it possible for the students to learn from their previous performance.
- C. The fifteen-week course allowed more time for the students to digest new ideas and concepts.

2. Do you think certain courses or disciplines are better taught in three weeks? Which ones and why? In six weeks? In fifteen weeks?

Mathematics

In three weeks one is likely to have more success teaching a political science course than a math course. In political science understanding one segment of material is not necessarily dependent upon what has previously been taught. Graduate math courses for math majors may be suited for the six-week treatment. A graduate student with a strong understanding of mathematics would be in a better position to keep up with the homework, and even if an assignment were not completed, the graduate student could probably still follow the next day's work.

Speech

It seems that the project indicated that courses requiring more intense study, perhaps in the math and science areas do not work well in the three-week time period. I feel that most courses in the Humanities, English, or Social Science areas would work well in either the three- or six-week sessions. In most of the above three disciplines, a student does not have to have completely mastered one theory or concept before moving on to the next. I do feel, however, that in six weeks, a person could handle any course. This seems to have been verified by the success of shorter spring and summer sessions.

Political Science

The advantages and disadvantages of short courses do apparently vary with the subject being taught. Where it is critical that certain facts be learned before going on to others (as in math) or where there is a great deal of time-consuming evaluation to be done by the instructor (as in English) the fifteen-week semester seems to be preferable. However, this could be true in any discipline depending on how it is taught and how the instructor does his evaluating. It might also depend on the number of students involved. Perhaps these difficulties could be overcome with a little experimentation--in the scheduling of class hours, for example. With approximately twenty students and only four exams it was no particular problem in political science.

English K

I am at a disadvantage in answering this since I don't actually know how other courses are taught; therefore, my answer is speculation or opinion. It would seem that a highly structured course, covering a set body of knowledge, following a single text closely, using short-answer tests would be best taught in three weeks.

The six-week course would lend itself to most any three-hour course except beginning skill courses where practice influences the end results (typing or shorthand or an art course would be examples). I do know, however, languages have been successfully taught at an accelerated pace, and I assume the success of such a schedule has to do with the daily contact hours between instructor and student.

The fifteen-week course is best for four- or five-hour courses requiring laboratory time and for introductory skill courses.

English H

The answer to this question is pure conjecture. Courses that have a specific data to be mastered and a certain limited number of concepts to be learned might be better taught in either a three- or six-week session, for example, mathematics or some of the physical sciences. (This judgment may, however, simply betray my lack of in-depth understanding of these disciplines.) Whereas, courses that introduce whole new ways of thinking to students would be more difficult for the student to grasp in the short-term sessions, especially the three-week session; for example, any of the Humanities.

3. What special characteristics must a student possess to do well in a three-week course? A six-week course?

Mathematics

For a six-week course and more so for a three-week course

- (a) The student should be highly motivated.
- (b) He should have good study habits.
- (c) He should be at least an average or above average math student.

Speech

In a three-week course, a student must have the fortitude to withstand three hours, five days a week of the same subject and the willingness to prepare material almost every day.

I don't feel that the six-week course requires any more of a student than the fifteen-week course. It does not seem more than any student could handle in terms of concentration.

Political Science

I'm not sure that any special characteristics are required to do well. In any course a student must have some motivation and ability. When you shorten the time span to three or six weeks the

lack of either just becomes apparent more rapidly, and it is more of a shock. Instead of it taking six weeks for a student to discover he is failing he finds out the first week--or in the first few days!

English K

The three-week treatment makes the most demands on the student. He should be in good health and have good transportation since a missed day is a missed week. He probably should be a better than average student--especially in reading comprehension. Further he should be a well-organized and adjusted individual--have good study habits. He also should be able to understand concepts and to sort out principles and concepts from supportive material that is presented at a fast pace. And last, he must have a natural aptitude or genuine interest in the subject since it's very easy to miss a concept and fall behind. I would like to add one additional hunch I have about the last statement. A student who feels inferior or at least has a background of failure in any given subject would panic and feel threatened if he fell behind and instead of working harder, would tend to less and poorer quality work.

The six-week course requires an average student possessing those characteristics listed above, but not to the degree required for the three-week student. I would reiterate the needs of good study habits, good attendance, and good transportation.

English H

Ability to assimilate material quickly; ability to distinguish general patterns and principles from specific data; to separate the principle from the example, illustration, or supporting data; to organize material; and to learn the principles from a limited number of examples.

4. What special characteristics should the instructor possess to teach a course in three weeks? Six weeks?

Mathematics

For a six-week course and more so for a three-week course

- (a) The teacher must be able to introduce ideas and concepts clearly.

- (b) He must be flexible.
- (c) He should be well organized and willing to grade papers quickly.
- (d) He must enjoy the subject.

Speech

In teaching a three-week course, the instructor must be prepared every day knowing definitely what he hopes to cover that day. He must be willing and able to get evaluated student papers and materials returned quickly. He must be healthy and plan to meet with the class every day. Above all, I feel that the instructor in a three-week course must be flexible in his methods and manner of presentation of the subject. In other words, he must be ready to adjust his teaching techniques and materials if the situation demands. However, I do not feel that his objectives for the course ever need to be sacrificed.

Political Science

The more successfully the instructor involves the student in the material the more successful the short course will be. A number of speech students did not want the course to end because they had become so wrapped up in their topics. An instructor who tends to lecture will be less effective because his students have no variety as they would with several different courses running concurrently in a fifteen-week semester.

English K

For the three-week course, in addition to having good health, the instructor should have a personality that lends itself to the authoritarian approach to teaching, and he should have a liking for organization and structure. The instructor also should have a well-modulated voice and a pleasant delivery and expression. Another requirement is his ability to adapt to different ways of presenting material.

For the six-week course, the instructor requires no special characteristics except the one of good health.

English H

Basically the same special characteristics required of the instructor for the six-week session

are required for the three-week session. These are: ability to organize material in concise form; ability to make use of a limited number of well-chosen examples to illustrate the principles; ability to modify voice quality; ability to be flexible enough to use several teaching techniques at each extended class session. Though there is actually the same number of class hours in all three types of sessions, the very condensed three-week session produces a mental attitude in both the instructor and the student, that really shortens the time for actual classroom performance. Thus to cover the same material in an extended class session (two hours or more at a given period), the instructor must arbitrarily limit the class discussion and run the risk of being authoritarian in attitude. For certain instructors with a given set of personality characteristics, this would not be a problem.

5. Do you feel that certain hours of the day (including breaks) are more conducive to success with the three- and/or six-week courses? Which hours and why?

Mathematics

The schedule for the courses was fine. It would be best not to have the classes early in the morning or late in the afternoon. On a given day the longer the time between blocks of classes the better. The time between classes gives the student the opportunity to prepare for the next class meeting. It was very helpful to have a classroom available where students could study together.

Speech

I felt the morning hours were better in both the three- and six-week sessions. It seemed that both the students and I could think a little better (this is a personal opinion). I see no reason why the afternoon wouldn't work. I think it would also be possible to take the three hours together on some days. In the six-week sessions, I would prefer teaching the two hours together on most days.

Political Science

Since we had no variety in hours it is difficult to determine whether some are better than others. One of the many reasons that my control group was not very satisfactory was that it met at 3:00 on Friday but it was a minor factor.

In the three-week semester it is very useful to have a break between classes. The one-hour period gives an opportunity for exam taking, for example. In the six-week program it might have been better to have the classes meet for three hours two days a week and one hour one day instead of two hours two days and one hour three days. There would have been more continuity.

English K

All courses at Delta College are best held in the morning since many of our students have part- or full-time jobs. However, since this simply isn't possible as policy in scheduling hours of instruction, at least having the hours break down to either all morning or all afternoon does seem a need if possible. With this in mind--

For the three-week course there should not be both a break hour and a lunch hour intervening the class sessions as I had during the project semester. The best arrangement would be two hours of class, a break or lunch and then another class hour. One three-hour session is too long to maintain interest, and a two-hour break makes the total period of attendance too long to fit the needs of the majority of students. I would use the final hour as I did for the project as a period to introduce new material and for testing.

For the six-week course an ideal schedule would be: one class-hour days--English/break/other class. Two class-hour days--two consecutive hours of English. The two consecutive hours add up to more than two one-hour classes, and the break period between classes allows the student to prepare for the upcoming hour.

English H

Given the nature of the student body at Delta College where a large percentage of the students hold part-time or full-time jobs, the hours of the day when the class meets is very important. The best time seems to be between 9 o'clock and 12 noon. The second best time would be from 12 to 3 o'clock in the afternoon. I think it unadvisable to attempt to have one part of the class session before lunch and the second half of the class session after lunch.

6. How did you have to alter your teaching techniques for the three-week course? Six-week course?

Mathematics

Again for the six-week treatment and more so for the three-week treatment

- (a) I alternated discussion with individual work at desks.
- (b) Gave more time for doing problems in class.
- (c) Gave more individual help.
- (d) Gave more tests.
- (e) Did not cover as much material.

Speech

In both the three- and six-week sessions, I didn't alter the amount of material I covered compared to the fifteen-week session, but I had to be very alert to making advanced assignments so that as one round of speeches were being heard, the next type of speech was being assigned. In my particular course, I didn't feel that I needed to make drastic changes because I had already built variety into the course. However, in other types of courses, it may be necessary for the instructor to vary teaching techniques or materials to break up the monotony of only lecturing or only conducting discussions, etc. The major concern for the instructor should be to be prepared every day with assignments, class work and/or evaluated materials for the students.

Political Science

Actually I changed technique very little during the experiment. After the first three-week session I was of the opinion that I should make an effort to get more classroom participation and discussion but the second group of students, having spent their first period in speech, were naturally so loquacious as to require a bit of repression.

It has however resulted in some changes now that I am back on regular semesters. My classes are much less formal.

Although techniques did not really change it was easier (as indicated in answer to #1) to tailor the material to the interests of each class.

English K

The fast pace of the three-week course forced me to abandon two tried and true teaching techniques for teaching a freshman composition course. The student journal requires reflection that takes time that wasn't available in such a short period of time. The other technique involves a longer student project for the semester and often requires lengthy library time or meetings outside of class time of two or more students who might be working on a project as a group. Also, I couldn't use the cognitive approach to better writing except in a sketchy way. Again the limited time didn't allow the student the proper amount of time for reflection and growth of awareness and thinking which invariably results in a better and fresher writing skill.

Another technique to teach writing skill deals with revision of first draft material and proofreading material. I found I didn't have the time available to do an adequate job of grading, returning, and re-grading rewritten papers.

Finally, since I had to present a more structured course, I was forced to use fewer examples of concepts and principles. I also had to devise new ways of presenting material almost daily to keep interest. And yet attempting a new way resulted in a break out of the structured approach; I felt it left students somewhat confused and I noticed on student evaluations that they felt the course was "disorganized."

In presenting the six-week course I merely doubled the speed of my fifteen-week course. There was time for some work in student journals, etc., and I felt at least the lower ability students benefited from the techniques I normally use. In other words and to the point, the six-week period seems to be about right for English composition.

English H

Six-week course: The technique changed very little. I divided the class period into two blocks with a break of fifteen minutes between the sessions. In the first session we discussed the reading material assigned the day before, and talked about the ideas and concepts involved as well as the

composition techniques used by the writer. In the second session we talked about principles and techniques of writing and reviewed the papers written by the students.

7. What do you see to be the advantages and disadvantages of teaching a course in three weeks? Six weeks? Fifteen weeks?

Mathematics

In a six-week course and more so in a three-week course

- (a) The instructor gets to know the students better and more quickly.
- (b) It was helpful occasionally to have a two-hour block of class time.
- (c) There was little time to decide whether a student should drop the course.
- (d) It was difficult to handle different needs of students.
- (e) The students complained that they were treated as high school students. One reason for this reaction could be that the students spent much time in the same classroom with the same instructor.

In a fifteen-week course the student often forgets what has been emphasized in a previous class. More time has to be spent in review.

Speech

Advantages of the Three-week Session

- 1. Course is over quickly if class isn't particularly appealing for student or instructor.
- 2. Get to know students better than in fifteen-week session because of constant exposure.
- 3. Class keeps with instructor on direction of course, assignments.
- 4. Don't have conflicts with assignments from other courses.
- 5. Carry-over and retention from day to day is excellent.
- 6. Less office hours needed--students take care of problems in class each day.
- 7. Better attendance because each day counts so much.

8. Two-hour blocks good for course continuity.
9. A student could pick a three-week course up in the middle of the term.
10. More relaxed atmosphere in class because students really got to know each other.

Disadvantages--Three Week

1. Students often feel that course is their whole life.
2. Instructor must get away from using one teaching technique to provide variety.*
3. Instructor must be prepared each day--no off days.
4. Absences count heavily.
5. Time is limited to take advantage of outside speakers or activities which could contribute to the class.

Six Week--Advantages

1. Would work better for courses that need lapse of time for ideas to take hold in the students.
2. Has advantages over the three weeks as far as planning time, effect of absences. Otherwise the three- and six-week sessions have almost equal advantages over the fifteen-week sessions.

Six Week--Disadvantages

1. Would prefer to have two-hour blocks instead of one-hour meetings.
2. Not as concentrated as three week.
3. Possible conflicts with other classes.

Fifteen Week--Advantages

1. Time to adjust teaching techniques and materials if needed.
2. Absences can often be made up.

Fifteen Week--Disadvantages

1. More office hours and students questions outside of class.
2. Loss of momentum and concern on part of students.

* If the instructor can only teach the class one way and cannot respond spontaneously to the needs of the class, it could spell disaster for a three-week session.

3. Conflicts with other classes.
4. Students know instructor and other students less.
5. On part of instructor, if five classes of the same subject are taught in one term, monotony can often result.

The advantages of the three-week course are the disadvantages of the fifteen-week course.

Political Science

In addition to those mentioned in answer to #1, an advantage is in office hours. Having far fewer students at any one time office hours go much farther.

A disadvantage, for both students and faculty, is with illness. Each day absent is a week. If a program of this kind were to be set up on a permanent basis it would be necessary to make arrangements for a permanent stand-in to take at least two of the three hours a day in a three-week session.

English K

My answer for the three-week course should be fairly obvious from my other answers. The accelerated rate I felt put too many special requirements on the weather, classroom material, students, and instructor for it to be workable. Both the three- and the six-week courses did have advantages in spaced final exams and a decrease in student office hours since the students in the project seemingly felt they needed no further contact with the instructor. (This is pure conjecture on my part--but the students in the control group did come in to ask at least one question from time to time and stayed to just "chat" for fifteen minutes as a rule after the initial question.)

For the six-week course the continuity afforded was the main advantage. Concepts could easily be picked up the next day without summarizing since we met daily. During the two class-hour days I could cover concepts and give them adequate reinforcement.

The fifteen-week course allows the use of proven techniques for the presentation of a course that does not cover a set body of knowledge as well as those that do cover such a body of knowledge.

Courses requiring special techniques, or just time, should be reserved to allow reflective thinking to surface. The longer course period also allows student project work and is more forgiving of weather, health, and transportation problems. Finally, as stated before, a student who is marginal in any given discipline has more time to adjust and be helped individually in the traditional fifteen-week period.

English H

I cannot speak with authority about the three-week session because I did not teach a three-week course. I would guess, however, from what I have learned from the six-week session, that it would be an almost impossible task. There is simply not enough time in the day to do the type of reading, writing, and reflecting upon the material in the three-week session. Though theoretically there should be the same amount of time to devote to the subjects taken as there would be in taking five courses over a fifteen-week period, it is just not possible to gear the human machine to the tight routine of three weeks; and achieve the same result.

The other advantages and disadvantages of the six-week session over the fifteen-week session, and the reverse, are listed in the answer to question 1 above.

8. Has your opinion of the effectiveness of the three- and six-week treatments changed from that held prior to the experiment? Why?

Mathematics

Before the experiment I was uneasy about teaching the three- and six-week courses, and I am much less eager to teach them now. My answers to the first seven questions tell why.

Speech

I did not have a great deal of faith in the three-week sessions at the start of the project, but I did feel that the six-week would prove effective because of past experiences with spring and summer 7-1/2 week sessions. After the project, I feel pleased that 1 1/2 weeks less time than a

spring term will work, but I am more impressed with the results of the three-week sessions. To me, the pace and concentration of the three-week course is refreshing and exhilarating and my students responded so favorably to it that a fifteen-week term seems a little trying for me now.

Political Science

Yes. At the outset I was quite critical of shortened semesters, doubting that the student could gain an adequate comprehension of the subject matter in such a concentrated period of time. By the end of the first three-week course, however, I had changed my mind. And my opinion still is that in certain disciplines, at least, they can learn as well if not better in a concentrated course as in a traditional semester and that in addition it has some special advantages for the instructor.

English K

For the three-week course--No. I didn't feel I could grade twenty-odd themes twice weekly plus teach writing as a skill.

For the six-week course, I was more open-minded at the start, and I was even more pleasantly surprised to find the course was so enjoyable. I feel both the students and I enjoyed the daily contact. I feel interaction has to occur before learning begins. This happened early in the six-week course. In contrast, the fifteen-week course seemed to drag.

English H

My opinion of the effectiveness of the six-week session has changed some. I think that the same material can be covered in six weeks that is covered in the fifteen weeks without the attendant lack of interest that tends to develop in a fifteen-week session. Further, there is more chance to get to know the students as persons, to assess their problems, and to help them in the six-week course because the instructor and the students are in contact with fewer persons during those six weeks than they are during a fifteen-week session. Furthermore, they are in contact with each other more hours during each day. The close contact welds the persons

together as a learning group more quickly and on a deeper level than the fifteen-week session does. This helps to overcome some of the psychological blocks that tend to get in the way of the learning process.

I liked the six-week session and would like to teach other courses on the same basis.

9. Please answer any other question that should have been asked.

Speech

I have participated in experimental teaching projects elsewhere; the latest on a college level being a combination of TV teaching and classroom work and thus far I haven't been as excited by the results of the projects as I have by this one. I strongly feel that for students and instructors alike, shorter sessions provide, in most instances, an excitement and challenge often missing in conventional semester classes.

English K

What other positive benefits came from this project?

One benefit was the close inter-relationship with the instructors from other divisions. I particularly became more acquainted with the relationship of the freshman English composition course to freshman speech and political science.

Another was the benefit I felt the students had from the personal contact with a counselor. The close contact here allowed him to recognize and solve student problems almost as they were happening. We lost fewer students because of this. I realize that sheer student load works against such close supervision by a counselor, but it does seem to point out the value of such a contact and is something we at Delta should be working towards.

Did you like the project course format?

For the six-week course I think that presenting English and Math first and then the other courses was good. I taught concepts that I am sure students did use in their next two courses. When I got to the

three-week groups, however, I found to my dismay that English was placed at the end or nearly the end of their semester. I do not mean to imply that English is to be first because of any prejudice on the part of this instructor--merely mentioned here as I think a logical sequence of courses.

Summary of Instructor Opinion

There were indeed differences in the instructors' responses to the questions concerning their evaluation of the project.

The mathematics instructor liked the regular fifteen-week treatment best as she felt that in the shorter courses the students did not have enough time to absorb material, the course lost flexibility, and mathematics tended to appear more mechanical. The Speech and Political Science instructors liked the three-week classes the best because they allowed the instructor to get to know his students better, there appeared to be better continuity, and the boredom of repeating the same material to several sections of the same course was eliminated. The English teachers preferred the six-week courses because they provided better continuity than the fifteen-week course and still did not force elimination of certain techniques as did the three-week course.

When asked which courses or disciplines were better suited to the different time modes, all except the English instructors thought most courses in the Humanities, English, or Social Science areas would work

well in either three weeks or six weeks. The English people felt that highly structured courses, covering a set body of knowledge, following a single text (such as math) would be best taught in three weeks.

The Political Science instructor felt that the student needs possess no special characteristics to do well in an abbreviated course. The rest felt the student had to be highly motivated with good study habits, good health, and good transportation to do well in the shorter courses.

All felt that to do well in the shorter courses the instructor must possess the characteristics of flexibility, organization, willingness to grade papers quickly, and be able to introduce ideas and concepts clearly.

Most of the teachers did not drastically alter their teaching techniques. The three-week English classes were more structured and the students were not required to keep a "student journal" or write a longer project because of the lack of reflective time. The mathematics instructor gave more time for problems in class, more individual help, more tests, and did not cover as much material in the shorter courses.

The English and Mathematics teachers felt there were too many special requirements on the weather, classroom, material, student, and instructor for the three-week course to be workable. All felt there were some

advantages for the three-week sessions, namely, getting to know your students better and more rapidly, better course continuity, fewer office hours required, and absence of conflict on assignments and exams. The six-week courses were felt to possess most of the advantages of the three-week sessions plus having additional planning time and lessened effects of absences. For all except the mathematics teacher the fifteen-week sessions seemed to drag in comparison to the shorter courses.

Initially, the English and Mathematics instructors doubted the effectiveness of the three-week courses and after teaching them felt their reservations had been justified. The Political Science and Speech teachers started the three-week courses with the same reservations but reversed their opinions after teaching the courses. All of the teachers approached the six-week courses with a more open mind and, except for the mathematics instructor, were pleasantly surprised to find teaching them so enjoyable.

Four of the five teachers in the project have expressed a desire to teach more of these shorter-duration courses when offered in the future.

CHAPTER V

SUMMARY AND CONCLUSIONS

At the community junior college level the mortality rate for many courses often exceeds 50 per cent, where either not passing or withdrawing is classified as a mortality. It was hypothesized this problem could be alleviated if the student was permitted to concentrate his efforts on one or two courses for a shorter period of time. To test this hypothesis some Algebra, Speech, English, and Political Science courses were taught at Delta College in three different time modes. The courses in the first time mode were called Intensive and had the students taking the courses sequentially, one at a time, with each three-semester-hour course meeting three hours daily for three weeks. The courses in the second time mode were called Semi-Intensive in which the students took two courses concurrently with each course meeting seven hours per week for slightly more than six weeks. The courses in the third time mode were the regular semester courses meeting three hours per week for fifteen weeks.

It was the purpose of this study to determine if there actually was a difference in the intensive, semi-intensive, and regular courses with respect to: (1) Academic achievement, (2) Mortality rate, (3) Students' attitudes, and (4) Instructors' attitudes.

Testing for differences in academic achievement was done primarily using analysis of covariance with pre-test scores used as the covariate for post-test scores. Secondary and supportive analysis was accomplished using the final course grade as the criterion for academic achievement. When differences did occur, Scheffé post hoc analysis was used to determine which time mode was superior. The analysis of mortality rates was done via chi-square contingency tables or the Fisher Exact Test. To determine if differences existed in student attitudes toward instruction under the three treatments an evaluation form was subdivided into four categories: (1) Attitudes, (2) Teaching Skills, (3) Course Organization, and (4) General. Since these categories are not independent, the analysis was accomplished using multivariate analysis of variance. The instructors' opinions about the three approaches were determined using a subjective type questionnaire.

Findings

When the pre-test and post-test scores were used to define academic achievement, there were no differences

in the three treatments for College Algebra and Speech, the six-week Intermediate Algebra was better than the fifteen-week class, both the six- and fifteen-week Freshman Composition classes were superior to the three-week classes, and the three-week Political Science course was better than the six-week course which in turn was better than the fifteen-week course.

Using the final course grade as the criterion of achievement, no difference could be found for the algebra courses, both the three- and six-week treatments were superior to the fifteen-week treatment for Political Science, the six-week Speech course was better than the fifteen-week course, and in English the three-week courses produced higher grade point averages than did the fifteen-week courses. This latter reversal can be explained, at least partially, by an uncontrolled instructor grading variable.

Except for the mathematics, where there were no differences in the mortality rate, the fifteen-week courses had a higher mortality rate than did either the three- or six-week courses.

Analysis of the Student Evaluation of Instruction Form revealed that for all the courses except College Algebra any differences that existed between the three-, six-, and fifteen-week groups could be attributed to a single category. In Speech, Teaching Skills were rated

higher in the three- and six-week courses than they were in the fifteen-week course. The General category was rated lower by the three-week English classes than by the six-week classes. Political Science showed no differences and the fifteen-week Intermediate Algebra class rated the instructor better in the Attitude category than did the three-week class. In College Algebra the fifteen-week class rated the instructor better than both the three- and six-week classes in Attitudes and Teaching Skills but only better than the three-week class in the General category.

When questioned as to whether they preferred taking these courses in three weeks, six weeks, or fifteen weeks, the people who had taken the courses in fifteen weeks, while showing a slight preference for the fifteen-week courses, were not strongly enough opinionated to reject the hypothesis of equal preference. The people who had taken the courses in six weeks definitely preferred the courses in the six weeks. The students who had taken the courses in three weeks preferred the Political Science and Speech in three weeks but were just about equally divided as to if they preferred the three-week or six-week treatment for English and Mathematics.

The Instructor Questionnaire found all of the teachers, except for the one teaching mathematics,

favorably inclined toward teaching classes in shorter periods of time. The Political Science and Speech teachers preferred the three-week classes while the English instructors thought the six-week classes were better. Some of the advantages listed for the shorter-duration courses were better course continuity, the instructor gets to know the students better and more quickly, and fewer office hours are required for help outside of class.

Conclusions

Based on the results of this study, it appears that certain courses are indeed taught in a more effective manner under the intensified and semi-intensified systems of instruction than under the conventional semester system. Both the students and instructors involved with the study felt that many courses in the Humanities and Social Science areas are most effectively taught under the intensified system of instruction. Courses such as Freshman Composition and Mathematics can more effectively be taught under the semi-intensified system of instruction as there is not quite enough "meditation time" under the intensified system. Other courses, especially in the Sciences where laboratory work is an integral part of the course, were felt to be best taught via the conventional semester method of instruction. The analysis of the mortality rate

certainly supports these contentions while the analysis of academic achievement supports--or at least does not contradict--their feelings.

Several students commented that care should be taken in the selection of students for participation in the intensified and semi-intensified courses with only the students who are better prepared or more gifted academically being allowed to participate. The assumption that these students are better suited to the intensified and semi-intensified methods of instruction does not appear to be justified. However, students should not be forced to take, or instructors forced to teach, a course in these different time modes. The psychological composition of some people almost precludes the possibility of successful completion of a course of this nature. Some instructors feel that a course cannot be taught effectively in these shorter time periods, and for them, they are right. Others can function effectively teaching a course under the intensive, semi-intensive, or conventional semester method of instruction. Similarly, students who believe they will do better in a course of shorter duration probably will. To recapitulate, courses should be taught in different time modes, but participation in these courses, on the part of both the students and the instructors, should be voluntary.

Discussion

It seems that many studies comparing the effectiveness of two or more methods of instruction, especially those involving different time modes, have a limitation in that they have introduced a selection factor in their sample which could bias the results. This study is no exception. The intention, for the purpose of this study, was to draw from the Delta College student population enough students taking courses in English, Political Science, Speech, and Mathematics so that a random selection into the three-week, six-week, and fifteen-week courses could be made. If this could have been done, most of the variables would have been controlled. All of the students would have had basically the same course load, over the same total time period, with the same instructors. As things turned out, because of the lack of a sufficient number of volunteers, intact classes had to be used for the fifteen-week control groups, while the volunteers were randomly assigned to the three-week intensified and six-week semi-intensified treatments. This resulted in the experimental groups taking the same four courses from the same instructors while the control groups had the same instructors for the courses that were taught in the project but had a wide range of other courses from different instructors for the rest of their schedules. The experimental groups

consisted primarily of incoming freshmen while the control groups contained some sophomores and second-semester freshmen, thus possibly introducing a maturation factor. The educational majors in the fields of business, trade-technical, health, and engineering were essentially excluded from the experimental groups because of special curriculum demands such as laboratory times or as in the case of engineering, because of the level of mathematics taught, but these majors could well have been represented in the control groups.

The president of Delta College assigned a specific counselor to the project as part of his counseling activities. This counselor has a fantastic memory and after meeting with the students to entice them into the study, and again to rearrange their schedules, he was able to recognize each participant of the project on sight, call them by name, and know something about them. With this type of rapport between the participants and the counselor, the students felt they were something special and strove to prove they were special. The students in the control groups did not receive this special attention and thus had no need to prove anything.

Another factor that could well have influenced the results of this study is that each experimental group stayed together as a group, finishing one class, and moving intact to the next class. As a result they

became a very close-knit group, studying together, eating together, recreating together, worrying about each other, and helping each other. As one student commented, "We were like an island in a vast ocean." This obviously made giving speeches and participation in classroom discussion much easier because of the common bond. The control groups did not have this cohesiveness as the students were only together for the one class as the composition of the other classes they were taking consisted of completely different students.

It seems there is one other area of weakness in this study, namely the evaluation of academic achievement. For the mathematics courses, well-known standardized tests that were deemed appropriate for evaluation of the content contained in the courses were used, so there was no problem in this discipline, but there were problems in the other three disciplines. In Political Science the same test was used for pre-test and post-test and although the reasoning was that with 100 questions the students could not remember the questions from pre-test to post-test, this may or may not have been the case. In either case, the study could have been strengthened if different but equivalent forms of a test had been used, assuming of course that the validity, reliability, and equivalency had been established.

The evaluation of academic achievement in English via pre-test and post-test should have been adequate. The results of the tests were not used in any way for the determination of the grades that were given for the course. In an attempt to eliminate any instructor bias that might exist, either for or against the experimental groups, a panel of three English professors, who were in no other way associated with the project, graded the pre-tests and post-tests. Both tests consisted of two parts. The first part was analysis of an essay with specific questions asked about the student's interpretation of the essay's meaning. For the second part, a slide of a painting was projected on a screen for the subject of a 500-word theme in which the student was to tell why they would or would not hang the painting in their room. While both the paintings were abstracts, the pre-test painting contained discernable objects while the post-test painting really did not--it took real imagination. Perhaps this partially explains why the scores on the post-test were lower than on the pre-test. Most of the students did not like the painting used for the post-test and had a difficult time explaining why they did not like it.

The students who took the English courses in three weeks had them during the third and fourth three-week periods. They also showed the most decrease in

score from pre-test to post-test. One possible explanation for this decrease could be that the students somehow found out that the grade for the course would not in any way be affected by the post-test score. They might have found out either via the grapevine or by an offhand comment from one of the instructors.

Another weakness in the evaluation of English achievement was that two teachers had been used with one instructor teaching both three-week classes, one six-week class, and one fifteen-week control group while the other instructor taught just a six-week class and a fifteen-week control group. There definitely was a difference in the grades given by these instructors with the latter grading more stringently. As a result, in any analysis where both instructors were involved the three-week group shows up better. If each instructor had taught all three treatments, most likely the academic achievement as determined by the course grade would not have been different for the three treatments.

Instructor bias in the evaluation of achievement in Speech could also have been better controlled by utilizing the concept of evaluation by a three-person team rather than by just the instructor teaching the course. This would greatly increase the amount of time and money expended in evaluation, or else be an imposition on colleagues' time if performed gratis.

Implications

Delta College has this last year, partially because of the conclusions drawn from this study, initiated "mini-courses" beginning about mid-term and running until the end of the semester. The selection of courses offered was again from high-enrollment courses, but did include courses other than those offered in this study.

Along this same line there is currently under consideration a Proposal for Variable Length Sessions at Delta College. This proposal was presented with the hope that it would serve as the beginning of a more flexible scheduling pattern at Delta College. The stated objectives of the proposal are:

1. Provide a variety of time availabilities for students.
2. Provide more entry points for starting courses.
3. Provide the opportunity to "compact" sequential courses.
4. Alter the scheduling pattern to encourage students and staff to break traditional time modules.
5. Improve the utilization of human and physical resources.

The initial list of likely candidates for variable length sessions contains some forty-six courses covering most academic disciplines, of varying degrees of difficulty, on both the freshman and sophomore levels.

Any expanded project of this type should be studied to determine if the apparent pattern of students

preferring and doing better academically in certain disciplines under different time modes holds true. If the pattern is established that students really do better in courses such as political science and speech when taught in a shorter time mode, then longitudinal studies should be done to establish if there is a difference in retention.

Another aspect of any study on variable length sessions would be the time preference. When students have options of selecting courses in different time modes, beginning and ending at a variety of times, will they still elect to honor the traditional academic vacation periods such as two weeks at Christmas and one to four months in the summer? If they select different vacation periods as from the middle of November to the first of the year, how would this effect the utilization of faculty and facilities?

The project students were divided into four experimental groups with each group treated as a unit. The students would finish one class together and move in mass to the next class. As a result they became a very close-knit unit with group dynamics certainly being a factor in both the academic and mortality results. Other studies either controlling the group dynamics variable or else studying it as a primary variable would seem appropriate.

The lower mortality rate in the Project courses could be partially the result of the close relationship between the Project students and their counselor who could call each of them by name and knew something about their background. When the Project students had a problem they discussed it with him. The control group did not have this close student-counselor relationship. An interesting study could be developed to attempt isolation of this student-counselor variable to determine if it is a major reason for the decreased mortality rate.

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APPENDICES

APPENDIX A

LETTERS



UNIVERSITY CENTER, MICHIGAN 48710

Delta College is proposing a special program which should prove beneficial and interesting to students in certain curricula.

We invite you to attend one of the following half-hour sessions to hear about it:

Monday	July 20	7:30 p.m.	Room 104-D
Tuesday	July 21	10:00 a.m.	Room 108-D
Wednesday	July 22	2:00 p.m.	Room 104-D

If you cannot attend any one of these sessions, will you please call me?

Sincerely,

Stephen Konowalow
Counselor

jln

Phone: 686-0400, ext. 321



UNIVERSITY CENTER, MICHIGAN 48710

August 7, 1970

Congratulations! You have been selected to be a participant in our three-week sequential course project. Your schedule for the experimental classes is as follows:

9:00	MTWRF
12:00	MTWRF
1:00	MT RF

The first three weeks you will be taking Speech 112, the next three weeks Political Science 103, followed by Mathematics 119 and English 111.

If you wish to elect other courses in addition to the experimental courses, please contact Stephen Konowalow at Delta College, Ext. 321, to arrange for a course scheduling appointment.

Stephen Konowalow
Stephen Konowalow
Counselor



UNIVERSITY CENTER, MICHIGAN 48740

August 7, 1970

Congratulations! You have been selected to be a participant in our sequential course project. As you recall, you were promised individual counseling by Mr. Konowalow. Please call him at Delta College, ext. 321, as soon as possible to arrange a counseling appointment for sometime this week.


Stephen Konowalow
Counselor

APPENDIX B

ACHIEVEMENT EXAMINATION

Achievement Examination
Introduction to American Government
J. Wiley, Instructor

TRUE AND FALSE

- _____ 1. In a democracy the individual is secondary to the state.
- _____ 2. Democracy requires the majority to respect minority rights.
- _____ 3. Under a constitutional government, the majority is free to act in any way it desires.
- _____ 4. The Federalist Papers were written by supporters of the new constitution.
- _____ 5. The national government has only those powers specifically granted to it.
- _____ 6. The Constitution-makers believed that dividing power between the several branches of the national government would lessen the danger of arbitrary rule.
- _____ 7. During our Constitutional evolution since 1789, the relative power of the Congress has declined and that of the President has increased.
- _____ 8. The size and duties of the President's Cabinet are prescribed by the Constitution.
- _____ 9. Only one method of proposing Constitutional amendments has been used thus far.
- _____ 10. No amendment may be added to the Constitution until it has been approved by the Supreme Court.
- _____ 11. The 14th amendment, by placing restrictions on state power, made a great deal of state legislation subject to review by the Supreme Court.
- _____ 12. The central government of a confederation exercises direct power over individuals.
- _____ 13. A federal government divides power between a central government and constituent governments by means of a constitution.
- _____ 14. Interstate compacts are devices that permit several states to unite to solve a regional problem.
- _____ 15. Block grants permit the states to construct their own programs without detailed specifications.
- _____ 16. Each American citizen has a single vote; therefore, all are equal in political power.

- ___ 17. Constitutions place limits on the power of governments and public officials.
- ___ 18. The Virginia Plan submitted to the Convention favored the large states.
- ___ 19. As the Constitution was originally written, neither the Senate, nor the President nor the Supreme Court was chosen directly by the people.
- ___ 20. Concurrent powers are those shared by the state and national governments.
- ___ 21. In the McCulloch v. Maryland decision, the court held that the national government had exceeded its power by establishing a bank.
- ___ 22. The powers of the national government have been enormously increased by warfare and preparations for warfare.
- ___ 23. The Supreme Court has upheld state laws providing for free textbooks for students in church-operated schools.
- ___ 24. A member of a registered communist organization may not apply for or use a passport.
- ___ 25. The federal government has never outlawed a political party.
- ___ 26. From the time the Constitution was written, the Bill of Rights has applied equally to both the states and the national government.
- ___ 27. In 1896, in the decision Plessy v. Ferguson, the Court held that state-imposed racial segregation in itself did not constitute discrimination.
- ___ 28. In Brown v. Board of Education (1955) the Supreme Court invalidated the separate but equal formula for maintaining segregated schools.
- ___ 29. Poll tax requirements for voting in state and national elections are now unconstitutional.
- ___ 30. State laws which unreasonably classify violate the equal protection clause of the 14th amendment.

MATCHING

- | | |
|-----------------------------|---|
| ___ 1. discharge petition | a. irons out differences in a bill passed by both chambers of Congress. |
| ___ 2. Filibuster | b. the power of the Court to decide the constitutionality of laws. |
| ___ 3. senatorial courtesy | c. delays Senate action by prolonged debate. |
| ___ 4. conference committee | d. Interstate Commerce Commission |
| ___ 5. rules committee | e. Post Office |
| | f. Tennessee Valley Authority |
| | g. Veterans Administration. |

(continued)

- | | |
|---------------------------------|---|
| _____ 6. government corporation | h. is designed to regulate the flow of bills in the House |
| _____ 7. regulatory agency | i. is veto power of Senator over major appointments in his state when his party is in power |
| _____ 8. judicial review | j. is an action to force bill out of committee |
| _____ 9. writ of certiorari | k. An order issued by the Supreme Court agreeing to review a case from a lower court. |
| _____ 10. Cloture (Closure) | l. a court order commanding that action be taken |
| | m. a device to limit debate in the Senate |
| | n. ends a legislative session. |

TRUE AND FALSE

- _____ 1. The principle of jus soli confers citizenship by blood rather than place of birth.
- _____ 2. Conviction by a court martial of desertion in time of war automatically results in loss of citizenship.
- _____ 3. The law stipulates that voting in a foreign political election automatically revokes American citizenship.
- _____ 4. Substantive due process requires that the content of the law be fair.
- _____ 5. No police officer can search either a home or a person, under any conditions, without a search warrant.
- _____ 6. Evidence secured unconstitutionally cannot be used in a federal court against an individual from whom it was taken.
- _____ 7. All of the guarantees of the Bill of Rights are now applicable to the States under the Supreme Court's interpretation of the 14th Amendment.
- _____ 8. The right to practice one's religion is an absolute right and cannot be regulated by state laws.
- _____ 9. One of the guidelines for judging obscenity in a book is the question whether the material has redeeming social value.
- _____ 10. An individual's political attitudes and party preferences fluctuate widely over the years.
- _____ 11. Approximately 50 percent of the potential voters will fail to vote in a Congressional election.
- _____ 12. The framers of the Constitution wrote into the document a prohibition against property requirements as a condition for voting.

- ___ 13. Local elections attract more voters than national elections.
- ___ 14. One of the most accurate predictors of political involvement is the amount of formal education.
- ___ 15. Litigation is a weapon of group influence.
- ___ 16. The government tends to overrepresent those groups which are strongly organized.
- ___ 17. Our major parties are essentially loose groupings of state and local parties.
- ___ 18. The best explanation for our two-party system lies in the nature of our electoral system.
- ___ 19. The Constitution has shaped the federalized structure of parties.
- ___ 20. There is some indication that party primaries tend to divide parties to a greater degree than do party conventions.
- ___ 21. The office group ballot encourages straight party voting and is thus preferred by most political scientists.
- ___ 22. A presidential election has never been thrown into the House of Representatives.
- ___ 23. Political parties in the United States are oriented toward state and local organizations rather than national goals.
- ___ 24. In the event that no Presidential candidate receives a majority of electoral votes, the House of Representatives selects the President.
- ___ 25. A voter cannot technically vote directly for the President.
- ___ 26. Senate approval is needed for Presidential appointments and for Presidential action to remove officials from office.
- ___ 27. If the President fails to sign or veto a bill within ten weekdays after he receives it, and Congress is still in session, the bill becomes a law.
- ___ 28. The President has the power to recognize a new government.
- ___ 29. Seniority undercuts the party system, since power comes from tenure rather than from the party.
- ___ 30. A Conference committee is indispensable in a bicameral legislature.
- ___ 31. The party caucus in the House plays a major role in lawmaking.
- ___ 32. Congress possesses no other powers than those directly related to the lawmaking process.

- ___ 33. Both the House and the Senate pride themselves on their tradition of permitting unlimited debate.
- ___ 34. The majority leader in the Senate is a figurehead with little influence.
- ___ 35. Federal district courts employ a jury system.
- ___ 36. A writ of certiorari is similar to a bill of attainder.
- ___ 37. The power of judicial review is explicitly granted to the federal courts by the Constitution.
- ___ 38. The Supreme Court will, upon request, give advisory opinions to the Congress or the President.
- ___ 39. Supreme Court Justices decide only those disputes that grow out of actual cases.
- ___ 40. Special investigating committees do not ordinarily introduce bills.
- ___ 41. If a committee in the House fails to report a bill, the bill cannot be brought to the floor of the House.
- ___ 42. The majority party in Congress has controlling representation on each standing committee.
- ___ 43. A complete system of federal courts was established by the Constitution.
- ___ 44. The vote of the Supreme Court justices must be unanimous to declare a law of Congress unconstitutional.
- ___ 45. Normally the Supreme Court avoids the issue of constitutionality if it can dispose of a case on other grounds.

MULTIPLE CHOICE:

- ___ 1. As a result of their Colonial experience, American colonists became accustomed to all but one of the following characteristics of government:
 - a. bicameral legislatures
 - b. weak governors
 - c. separation of powers
 - d. elected representatives
- ___ 2. Congress under the Articles of Confederation did not have the power to:
 - a. regulate interstate commerce
 - b. coin money
 - c. declare war
 - d. make treaties

- _____ 3. Which of the following individuals is most likely to exercise his right of suffrage:
- a. a southern Negro, eight-grade education, working in a textile mill
 - b. a middle-income banker, age 50, registered Republican
 - c. a union worker in Detroit, high school graduate, Democrat
 - d. a 23-year-old secretary living in Atlanta, Georgia.
- _____ 4. The most significant function performed by third parties in the United States since 1865 has been:
- a. to serve as a base for future major parties
 - b. to focus public opinion upon new controversial political issues
 - c. to introduce future major party candidates
 - d. to express discontent with the basic Constitutional framework.
- _____ 5. Many reasons have been advanced to explain why we have a two-party system. Probably the best explanation is:
- a. The American Constitution sets up single-member districts and the President is elected by a majority of electoral votes
 - b. Americans very early rejected the multiparty system because it contributes to political instability
 - c. people are naturally divided into liberal and Conservative groups
 - d. the two major parties "steal the thunder" from any rising third party.
- _____ 6. The two houses of Congress may override a Presidential veto by:
- a. majority vote
 - b. three-fourths vote
 - c. two-thirds vote
 - d. favorable vote in two successive sessions.
- _____ 7. The executive office of the President includes:
- a. Voice of America
 - b. Bureau of Weights and Measures
 - c. Interstate Commerce Commission
 - d. Bureau of the Budget.
- _____ 8. In the case of Marbury v. Madison, the Court decided:
- a. that Marbury was not entitled to his commission
 - b. that the Judiciary Act of 1789 was in part unconstitutional
 - c. that Madison must deliver the commission
 - d. that Jefferson had acted legally.
- _____ 9. A procedure in the House for withdrawing a bill from committee is:
- a. release b. conference c. filibuster d. discharge.
- _____ 10. A committee composed of members of both chambers to reconcile different versions of the same bill is called:
- a. a joint committee
 - b. a standing committee
 - c. a special committee
 - d. a conference committee.

- _____ 11. Among the powers of the Speaker of the House of Representatives is:
 - a. the power to appoint members of standing committees
 - b. major influence in the selection of committee chairmen
 - c. control of the rules committee
 - d. appointing House members to conference committees.

- _____ 12. The President's delegated legislative power might best be illustrated in:
 - a. his power to precipitate a war
 - b. his power to adjust tariff rates under the Trade Agreements Act
 - c. the State of the Union message
 - d. his veto power

- _____ 13. The President has exclusive power to:
 - a. make treaties
 - b. recognize new governments
 - c. appoint ambassadors
 - d. make foreign loans

- _____ 14. "Independent" Regulatory Commissions are independent because:
 - a. they are bipartisan
 - b. they take a special oath of a judicial nature
 - c. pressure groups do not work on them and their rulings have the force of law
 - d. their terms are longer than the President's and they may not be removed except for cause.

- _____ 15. The 25th Amendment:
 - a. makes the Speaker of the House second in the line of succession for the Presidency
 - b. changes Presidential succession in case of death
 - c. makes the Vice President "acting president" in case of disability
 - d. makes the Supreme Court the judge of disability.

English 111

Using the picture on the screen as your subject write a 500-word theme in which you tell why you would or would not (but not both) hang the picture in your room.

Think before you write. Organize your ideas so that your theme has an introduction of the subject of the theme , a development of that subject, and arrives at a conclusion. Do your thinking and organizing on a sheet of blank paper. After you have written your theme, proofread it for spelling errors, word usage, coherence of ideas, and sentence patterns.

English 111

Instructions:

After you have read carefully E. M. Forster's essay, "My Wood," answer the following questions. The questions are grouped into two parts. The first group of questions deals with comprehending the essay in terms of its structure, diction, and style. The second group of questions asks for your response to the essay. You may refer to the essay as often as you want to answer the questions.

I. Comprehending the Essay:

1. State the main idea of the essay in a single sentence.

2. List the ideas that E. M. Forster uses to support or develop his main idea.

3. How has Mr. Forster put together (organized) his essay?

4. Mr. Forster refers to both Biblical literature and to history to develop his ideas. Give an example of each type of reference.

A. Biblical reference:

B. Historical reference:

5. What historical knowledge may it be necessary for the reader to possess before he can completely comprehend the essay? Give two samples from the essay where you think special historical knowledge is necessary.

A.

B.

6. What words, phrases, and/or spelling that Forster uses reveal that he is an Englishman? Give at least two examples.

7. What kind of an audience is Mr. Forster writing for?

II. Evaluating the Essay:

1. Do you agree with what Mr. Forster says in the essay? What precisely do you agree with and why?

2. Do you disagree with what Mr. Forster says in the essay? Do you disagree with everything he says or with just certain points which he makes? What evidence can you present to support your position if you disagree with Mr. Forster?

Pre-Test

Pre-test--Speech

1. Why would it be important for an audience to respond, in some way, to a speaker and his communication?
2. Give one example of reasoning from general ideas to specific ideas.
3. What problems might a discussion group encounter while attempting to prepare a discussion to present to an audience?
4. What do you feel are some of the duties of the leader or chairman of a discussion group?
5. What factors about an audience do you feel are important for the speaker to understand before he prepares his speech?

6. What are some possible ways to lead into or begin a speech?
7. What qualities do you feel make a good speaker?
8. What ways could be used to create an atmosphere of competence or confidence on the part of the speaker?
9. What makes a good visual aid?
10. What factors would help a speaker in attempting to persuade others?

11. Other than organizing a speech according to a chronological (time) pattern, what other orders or types of organization would be possible?
12. Why is it important for anyone to be able to competently evaluate another speaker?
13. For what purposes are gestures used in speaking?
14. What possible types of visual aids can be used in giving speeches?
15. What could be some possible general purposes for giving persuasion speeches?

Post-test

1. Diagram the basic communication process from speaker to listener.
2. Give one example of deductive reasoning.
3. What are some of the elements of the "task environment" in discussion work?
4. What are some of the duties of the leader or chairman of a discussion group? Name at least four.
5. Why is audience analysis an important factor in the choosing of a speech topic?

TEST A

1. Name and explain the three (3) patterns used to organize speeches.
2. Why is competence as a speech critic important?
3. For what purposes are gestures used?
4. What are some of the types of visual aids which can be used in giving speeches?
5. What are the possible types of persuasion speeches?

TEST C

1. What is the purpose of an introduction and what are some of the types of introduction that are available?
2. What should the speech critic look for when evaluating a speaker? Name at least four (4) qualities.
3. What ways are suggested to create an atmosphere of competence on the part of the speaker?
4. What are some of the requirements for producing good visual aids?
5. Explain the importance of "source creditability" or ethos in the persuasion situation.

APPENDIX C

STUDENT EVALUATION OF INSTRUCTION

APPENDIX C

STUDENT EVALUATION OF INSTRUCTION

- 1-8 _____ Faculty Name 10 _____ Sex (Male = 0, Female = 1)
- 9 _____ Curriculum (Transfer = 0; Art = 1; Business = 2; Health = 3; Technology = 4; No preference = 5)
- 11, 12, 13 _____ Cumulative Grade Point Average (If a beginning freshman, use X.)
- 14 _____ I enrolled in this class because . . (it is required = 0; required but I would have taken it anyway = 1; elective = 2)
- 15 _____ Class (Freshman = 1, Sophomore = 2, Other = 3)

Each of the qualities listed below is divided into three sections. Each section is divided into three degrees and numbered accordingly from 1 to 9, with 1 being the highest rating and 9 being the lowest. In rating, draw a circle around the number which best describes your instructor.

Your FAIR and HONEST opinion is what really counts. Your instructor desires your opinion for his own self-improvement. Students, through direct classroom experience, are in an excellent position to judge an instructor's teaching effectiveness. The information will in no way be identified with any student individually so be unbiased in your judgment.

- | | | | |
|--|--|---|---|
| 17 KNOWLEDGE OF SUBJECT | 1 _____ 2 _____ 3 _____
Knows it very well | 4 _____ 5 _____ 6 _____
Is well informed | 7 _____ 8 _____ 9 _____
Lacks background |
| 18 ORGANIZATION OF THE COURSE | 1 _____ 2 _____ 3 _____
Carefully planned, well organized | 7 _____ 8 _____ 9 _____
Lacks planning, lacks organization | 4 _____ 5 _____ 6 _____
Fair organization |
| 19 TEACHING SKILL | 7 _____ 8 _____ 9 _____
Dry, uninteresting | 4 _____ 5 _____ 6 _____
Routine, average | 1 _____ 2 _____ 3 _____
Stimulating, interesting |
| 20 INSTRUCTOR'S ENTHUSIASM FOR SUBJECT | 4 _____ 5 _____ 6 _____
Passively interested | 1 _____ 2 _____ 3 _____
Genuinely interested, enthusiastic | 7 _____ 8 _____ 9 _____
Uninterested |

21 EXPLANATIONS, ANSWERS TO QUESTIONS	<u>7</u> <u>8</u> <u>9</u> Poor, confusing or questions ignored	<u>4</u> <u>5</u> <u>6</u> Short, often con- fusing, partially answered	<u>1</u> <u>2</u> <u>3</u> Clear, concise
22 ASSIGNMENTS	<u>1</u> <u>2</u> <u>3</u> Clear, easily understood	<u>4</u> <u>5</u> <u>6</u> Not well thought out, hurriedly given	<u>7</u> <u>8</u> <u>9</u> Vague, confusing
23 ATTITUDE TOWARD STU- DENTS	<u>7</u> <u>8</u> <u>9</u> Inconsiderate, sometimes rude	<u>4</u> <u>5</u> <u>6</u> Too often aloof or indifferent	<u>1</u> <u>2</u> <u>3</u> Considerate, not treated as a child
24 ATTITUDE TOWARD DIF- FERENCES OF OPINIONS	<u>1</u> <u>2</u> <u>3</u> Tolerant, allows for differences	<u>4</u> <u>5</u> <u>6</u> Tolerant but sometimes biased	<u>7</u> <u>8</u> <u>9</u> Recognizes no opinions but his own
25 EXAMINATION QUESTIONS	<u>4</u> <u>5</u> <u>6</u> Only moderately reasonable	<u>1</u> <u>2</u> <u>3</u> Clear, usually easily under- stood, fair	<u>7</u> <u>8</u> <u>9</u> Not clear, poorly phrased, often not fair
26 METHOD OF GRADING	<u>7</u> <u>8</u> <u>9</u> Unfair	<u>4</u> <u>5</u> <u>6</u> Usually fair	<u>1</u> <u>2</u> <u>3</u> Tries to be very fair and honest
27 SENSE OF HUMOR	<u>1</u> <u>2</u> <u>3</u> Keen sense of humor	<u>7</u> <u>8</u> <u>9</u> Seldom shows any sense of humor	<u>4</u> <u>5</u> <u>6</u> Sometimes shows sense of humor
28 WILLINGNESS TO HELP STU- DENTS AND BE AVAILABLE FOR HELP	<u>1</u> <u>2</u> <u>3</u> Always tries to help and be available	<u>4</u> <u>5</u> <u>6</u> Usually willing and available	<u>7</u> <u>8</u> <u>9</u> Reluctant to help, seldom can be found
29 POISE AND SELF-CON- FIDENCE	<u>4</u> <u>5</u> <u>6</u> Sometimes con- fused	<u>1</u> <u>2</u> <u>3</u> Poised, self- assured	<u>7</u> <u>8</u> <u>9</u> Disorganized, confused
30 ENJOYMENT OF COURSE	<u>1</u> <u>2</u> <u>3</u> Most enjoyable	<u>7</u> <u>8</u> <u>9</u> Dull	<u>4</u> <u>5</u> <u>6</u> Average
31 RATING OF INSTRUCTOR AS COMPARED WITH OTHERS	<u>1</u> <u>2</u> <u>3</u> One of the best	<u>4</u> <u>5</u> <u>6</u> Average	<u>7</u> <u>8</u> <u>9</u> One of the poorest

ADDITIONAL SUGGESTIONS:

What I especially liked about this class: _____

Suggestions for improvement (of course or method of
teaching): _____

Additional comments: _____

STUDENT EVALUATION OF INSTRUCTION

NUMBER OF WEEKS OF INSTRUCTION: _____ 3, _____ 6

In your own words answer the following:

32. Comment on your like or dislike of the project with respect to:

- (a) the subject matter
- (b) the instructor
- (c) the time of day
- (d) the intensity of the course

33. Comment on any aspect of the project other than those mentioned in #32 that has contributed to your enjoyment or dislike of this type of instruction.

34. If you had a choice, which of the following plans of study would you choose? Give reasons for your choice.

- (a) Take the courses one at a time with each course meeting 14-15 hours per week for about three weeks.
- (b) Take the courses two at a time with each course meeting 7-8 hours per week for about six weeks.
- (c) Take the courses four or five at a time with each course meeting 3 hours per week for the whole semester.

Reasons: _____

APPENDIX D

INSTRUCTOR QUESTIONNAIRE

APPENDIX D

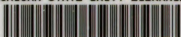
INSTRUCTOR QUESTIONNAIRE

1. Which of the three treatments (3 week, 6 week, or 15 week) did you like the best? Why? The least? Why?
2. Do you think certain courses or disciplines are better taught in 3 weeks? Which ones and why? In 6 weeks? In 15 weeks?
3. What special characteristics must a student possess to do well in a three-week course? A six-week course?
4. What special characteristics should the instructor possess to teach a course in three weeks? Six weeks?
5. Do you feel that certain hours of the day (including breaks) are more conducive to success with the three and/or six-week courses? Which hours and why?
6. How did you have to alter your teaching techniques for the three-week course? Six-week course?
7. What do you see to be the advantages and disadvantages of teaching a course in three weeks? Six weeks? Fifteen weeks?
8. Has your opinion of the effectiveness of the 3 and 6-week treatments changes from that held prior to the experiment? Why?
9. Please answer any other question that should have been asked.

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