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The Comparison of Achievement of Weekend Course Student Groups and Concurrent Course Student Groups of Nazareth College Management Division

Norm Woodin
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THE COMPARISON OF ACHIEVEMENT OF WEEKEND COURSE STUDENT GROUPS AND CONCURRENT COURSE STUDENT GROUPS OF NAZARETH COLLEGE MANAGEMENT DIVISION

by

Norm Woodin

A Dissertation
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the
requirements for the
Degree of Doctor of Education
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Western Michigan University
Kalamazoo, Michigan
December 1984
THE COMPARISON OF ACHIEVEMENT OF WEEKEND COURSE STUDENT 
GROUPS AND CONCURRENT COURSE STUDENT GROUPS OF 
NAZARETH COLLEGE MANAGEMENT DIVISION

Norm Woodin, Ed.D.

Western Michigan University, 1984

Record numbers of nontraditional students are enrolling in colleges today. These students are being actively recruited in an effort to overcome a decrease in enrollments caused by the declining size of the pool of potential traditional 18-year-old students. To accommodate these nontraditional students, colleges have had to adjust their traditional class meeting time schedules. One such class meeting time schedule has been developed where the class meets in large blocks of time on weekends. Many educators have questions about the academic credibility and worth of this nontraditional weekend class meeting schedule. This question became the basis for a research study.

The purpose of this study was to compare the learning achievement of students enrolled in weekend scheduled classes to the learning achievement of those enrolled in the more traditional concurrently scheduled classes which met once each week.

To conduct this study, achievement test scores of a weekend group were compared to the achievement test scores of a traditional, concurrent group. There were three different classes with a comparable section of the same class in each of the two groups, making
six class sections. An achievement test was given at the end of each class and the test scores were converted to a common metric, $Z$ scores. The weekend group scores were compared to those of the traditional concurrent group.

The hypothesis of the study was that there was no difference found between the achievement of students enrolled in weekend classes and the achievement of students enrolled in the traditional concurrent classes. To test the hypothesis a two-sample $t$ test was used with $\alpha$ of .20.

In this study the null hypothesis, which was the research hypothesis, was not rejected. The conclusion of the research was that there was no difference between the achievement of the weekend group and the traditionally scheduled group.

The study involved a small population in one college with non-quantitative based courses. Recommendations for future research suggests that the research design be used with larger samples and a variety of courses, groups, and class meeting schedules to establish external validity.
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Western Michigan University \hspace{1cm} Ed.D. 1984

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CHAPTER I

THE PROBLEM AND ITS SETTING

Introduction

Colleges and universities in the United States are currently experiencing disturbing enrollment decreases (Magarrell, 1982). These decreases parallel birthrate decline, a trend starting in 1960 which has continued to the present. Nationwide, the number of 18-year-olds available for college enrollment will decline 25%, from 4.3 million in 1980 to 3.2 million in 1992 (Breneman, 1983). Moreover, Glenny (1980) stated that denominational-related private colleges (DRPC) will be one of the categories of institutions of higher education which will be most vulnerable to enrollment decline in the 1980s. Mitigating this negative impact, however, is the older, nontraditional student, who is providing a current ray of hope in this dismal picture of enrollment projections (Breneman, 1983).

The nontraditional student is one who is beyond the usual college age of 18 to 22 years old, and usually has extensive time obligations, such as a job or domestic responsibilities. This group is becoming a significant part of the total college enrollment today. In 1970, men and women enrolled in colleges and universities who were above the age of 30 numbered 2,351,000; in 1980 this group was 2,799,000, or a 19% increase (Standard Education Almanac, 1982-83, 1983, p. 152).
If DRPCs are interested in adding this group to their enrollments, they will have to schedule college classes at times accommodating the schedules of the nontraditional students (Sutherland, 1980). One alternative is to schedule classes on weekends when nontraditional students are more likely to be free from work obligations (Zeik, 1980). Such classes would meet relatively few times, but each class period would be comparatively long. For example, a class might meet 15 hours during a weekend for 3 weekends to fulfill the accepted class time requirement for a three-credit-hour course. This schedule contrasts to the more traditional concurrent time format of meeting 3 hours per week for 15 weeks. However, such compressed scheduling has raised the question as to whether or not colleges and universities are compromising their academic integrity for the sake of financial expediency (Pasztor & Jaroslowsky, 1979; Zeik, 1980).

Statement of the Problem and the Purpose of the Study

While there are indications that DRPCs and others are adjusting their class meeting time schedules to satisfy the needs of the nontraditional student (Sutherland, 1980), such classes must continue to represent the same achievement by students. For example, nontraditional students who have successfully completed a nontraditional weekend course should be able to demonstrate that they meet the same level of competency that is required of a student taking the course using the traditional concurrent time format (Sawhill, 1978). If credit hours obtained under the traditional concurrent class meeting
time schedule are to be the accepted units of measurement for a college degree, the courses taught with the nontraditional time format must be equated to the traditional time formats or credit hours.

For the sake of the integrity of the college degree that is wholly or partially obtained through nontraditionally scheduled courses, a study should be done to compare student achievement under the nontraditional class schedule, in this case the weekend schedule, and the traditional concurrent schedule. The problem, then, is: Is the achievement of students taking weekend courses at Nazareth College, Kalamazoo, Michigan, the same as the achievement of students taking the same courses with a traditional time format? To determine the answer, a carefully controlled testing procedure was used to compare the achievement of Nazareth College students taking weekend classes with the achievement of Nazareth College students taking the same classes on a concurrent basis.

Limitations of the Study

The population of the study was limited to courses taught in the management curriculum at Nazareth College and to the students enrolled in selected classes. The students and instructors involved in the study were selected by virtue of the class in which they were enrolled or had contracted to teach.

There was not random selection of subjects in the study. The method of selecting courses and students to participate in the study is described in Chapter III, detailing the methodology of the research project.
Importance of the Study

Colleges and universities are using many innovative ideas in an effort to increase non-traditional students' enrollment (McDowell, 1974). One such innovation is the weekend class meeting schedule (Stashower, 1974). To protect the quality of the academic program, the weekend class meeting time schedule must be evaluated to determine if the level of educational achievement is being maintained. If the results from this research project indicate that there are some negative aspects concerning the educational achievement of students taking college courses on weekends, then adjustments in the form of class schedule should be considered.

Overview of the Study

A review of the literature is presented in Chapter II. Discussions concerning the following are included: historical evolution of the traditional class meeting time schedule, massed versus distributed practice, concentrated or intensive schedules, the academic calendar, weekend colleges, and student learning as related to time. Chapter III describes the methods by which the study was conducted and includes the research design, methods of data collection, and the study hypothesis. The results of the study and specific information with respect to demographic data are included in Chapter IV. The final chapter includes the finding of the research, limitations of the study, the value of the work, and recommendations for future research.
CHAPTER II

REVIEW OF THE LITERATURE

The development of the American college curriculum has definite historical periods (Knight, 1940). The first is the traditional liberal arts period, dominated by the classics and characterized by a fixed curriculum (Butts & Cremin, 1953). This curriculum dominated American education until the latter part of the 19th century. The second period began with the ascendancy of Charles W. Eliot to the presidency of Harvard College in 1869. This period was the start of a general change from the classical system of study to the elective principle of study (Knight, 1940). The elective system brought about a need for the credit system, which initiated the traditional or concurrent college class schedule.

Gerhard (1955) stated that under the classical system of education there was little need to be concerned with quantitative measuring of units. However, the rapid spread of the elective system in the 1870s necessitated the introduction of quantitative course measurement because there was a shift in fundamental criterion from the results attained to the "amount of time spent on a subject. . . . If, for instance, a year's work in plane geometry would be covered by way of two weekly hours, the subject would be counted as only 2/5 of a unit" (Gerhard, 1955, p. 658).

Two phases can be distinguished in the growth of the credit system: an earlier phase in which colleges started to measure the
teaching of subject matter in hour units, and a later stage in which the credit system was further perfected and became consolidated. The earlier period culminates with the recognition that "A 'unit' now meant a full year's work in one subject" (Gerhard, 1955, p. 657). The later period culminates in the formula that "an hour of credit is given for the satisfactory completion of work requiring one exercise of work a week for one semester, in recitation, laboratory work, or lecture" (p. 659).

After 1908 this statement was added to each individual course (at Washington University, St. Louis). When this full-fledged credit system was adopted, the Faculty minutes report, under the date of March 4, 1903: 'It is assumed that each hour of recitation or lecture shall involve approximately two hours of preparation and each two hours of laboratory one hour of preparation on the part of the average student.' The quantitative measurement could hardly be carried to greater length. (p. 659)

This is the concurrent system which is universally used in American education.

The concurrent course schedule, then, has dominated American higher education for over 100 years. However, no evidence appears to prove that it is educationally superior to other course schedules (Hefferlin, 1973). Hefferlin stated that he believed the traditional course schedule, also known as a type of distributed practice, has been perpetuated for bureaucratic reasons and mere tradition, rather than for educational reasons. He hypothesized that there is merit in the use of a more intense meeting schedule, a type of massed practice, in which the traditional semester class meeting time is scheduled within a much shorter time period than the normal 16 weeks. For
example, a normal semester class meeting time of 45 hours might be scheduled within a 3- or 4-week time period.

Massed Versus Distributed Practice

Underwood (1961) defined massed versus distributed practice as follows: The variable that distinguishes massed versus distributed practice is the length of time between a single presentation of subject matter. If the interval is short, say 2 to 8 seconds, it is said to be mass practice (MP); if the interval is longer—15 seconds or more—learning is said to be by distributed practice.

Powell (1976) stated that educational research during the first part of the 20th century took concurrent or distributed practice scheduling for granted. Throughout the 1920s and 1930s, two major research thrusts involving time were studied: the optimal length of a class period and massed versus distributed practice. These period-length studies posed such questions as whether a 45-minute period was better than a 55-minute period. If practice is spaced or separated in time, will learning be more or less efficient than if practice is bunched together? If there are 6 hours to study for three exams, should each topic be given 2 consecutive hours, or should each topic be given eight 15-minute segments separated by intervals in which alternate topics are studied (Houston, 1976)?

Studies on massed versus distributive practice in the early part of the 20th century involved the learning of both logical materials and such items as nonsense syllables. One of the earliest studies (Pyle, 1913) demonstrated that distributed learning is more
advantageous in avoiding errors but does not necessarily promote more rapid learning of logical materials. The conclusion was supported by Cummins (1919). Perkins (1914) presented data which permit a comparison to be made between the relative influence of the length of the study period and the interval elapsing between study periods on the economy of distributing effort. Sixteen repetitions of lists on nonsense syllables are divided into periods consisting of 1, 2, 4, and 8 readings of the lists with 1, 2, 3, and 4-day intervals for each period length, making 26 different distributions of the learning involved. In general, less was recalled after a lapse of 2 weeks when reading occurred every day than when separated by an interval of 2 to 4 days for all lengths of periods concerned. Using a multiplication drill, E. L. Thorndike (1916) found a given amount of work per day is done more advantageously at one continuous sitting than if distributed into four sittings on the same day. He also found that whether practice is spread over 24 days or is consolidated into 6 makes little difference, provided the long day's work is made at one sitting. Lyon (1914) conducted experiments on the relation of the length of study periods to the advantage of distribution. The work showed a consistent saving in time by distributing the memorization of the logical materials, i.e., prose and poetry. Gordon (1925) stated that massed learning is more effective for immediate recall of logical materials but that distributed learning is more effective for recall a month later. Considering the age of the subjects, Edwards (1917) believed distribution is more important to children than to adults. Cummins (1919) stated that adults learned French vocabulary
equally well under massed and distributed conditions. Ruch (1928) believed that age is possibly an important factor in learning and that optimal conditions for studying various sorts of materials should be worked out for different ages.

In the consideration of criterion of learning, Austin (1921) and Gordon (1925) both concluded that massed practice was more effective for immediate recall; but for long-term recall, distributed practice was more effective. Studies done by Cummins (1919) and Pyle (1913) demonstrated that distributed learning is more advantageous in avoiding errors but does not necessarily promote more rapid learning.

Ruch (1928) stated:

The possibility exists that distribution may be more effective during the initial stages of habit formation or learning of any sort and massing more efficient in the final stages, or vice versa, in which case a combination of a greater degree of distribution at one period and a lesser degree at others would produce the optimal arrangements of work and rest period. (p. 40)

Cook (1934) demonstrated that massed practice is more effective in early learning and distributed practice is more effective in later learning, especially if the task is to be relearned several weeks later. He further concluded (Cook, 1944) that in experiments with a spider maze, massed practice is more effective than distributed practice. Studying the relationship between distribution or practice and learning efficiency in psychomotor performance, Franklin & Brozek (1940) concluded:

1. There is no difference in efficiency of learning on these tests between relatively massed distributed practice as measured by total number of practice trials needed to reach plateau. 2. Learning on these is as
effective when trials irregularly scheduled are used as when sessions are strictly scheduled. (p. 23)

Underwood (1961) stated:

If DP [distributed practice] is to produce facilitation (of learning), the following conditions must be met: (a) there must be some minimal amount of interference in response acquisition so that the integration of the component of the correct response by the subject is slow, (b) error tendency must recover enough so that successive extinctions can be effective, but (c) the recovery must not be so great as to block or replace the correct association over several trials. The situation is not delicate early in learning when correct response tendencies are relatively weak and error tendencies relatively strong. Thus, the two critical manipulable variables are amount of interference and length of DP interval because these two variables allow indirect manipulation of strength of error tendencies and amount of recover of error tendency. (p. 237)

He went on to state that:

In general, the greater the interference, the shorter must the distribution interval be for facilitation to occur; . . . for distributed practice to facilitate learning when response interference is heavy, the distribution interval must be short. It is possible that when interference is very heavy, distribution practice will never facilitate learning. (p. 245)

Various studies have indicated distributed practice yields better recall than massed practice (Calfee, 1968; Landauer, 1969; Peterson, Wampler, Kirkpatrick, & Saltzman, 1963; Young, 1966). In addition, there is evidence indicating that when a repetition is distributed, the probability of recall tends to increase as a function of the number of intervening events between the two occurrences of the repeated event (Melton, 1970). Wenger's (1979) experiment with inattention concludes,

Subjects may not fully attend to any one item beyond a certain interval of time. Therefore, when items are repeated in adjacent list position (massed repetition),
subjects fail to make adequate use of the available time to process these items. As a result, study time is functionally greater for distributed repetitions than for massed repetitions. (p. 112)

Shuell (1981) set out "to investigate possible boundary conditions associated with the effect that DP during learning has on long-term retention and to investigate several possible theoretical explanations for this effect" (p. 590). He concluded that "retention is improved substantially" (p. 590) by distributed practice if relatively long distribution intervals occur. Moreover, experimenting with students learning French vocabulary, Bloom and Shuell (1981) concluded that initially massed practice may be most effective while later distributed practice may be most useful for retention.

Hefferlin (1973) related his work on massed versus distributed practice to the issue of concurrent versus intensive scheduling. He indicated that the introduction of time intervals between periods of practice results in more learning and better retention that the same amount of practice undertaken in one period. Hefferlin (1973) went on to state that it might seem that this repeated evidence of the advantages of the spaced practice in comparison with massed practice demonstrates the advantage of concurrent course schedules over intensive ones. He stated, however, that this seemingly relevant research provided no evidence in either direction; for while intensive courses obviously represent more concentrated effort than the concurrent ones, they do not constitute massed practice in the sense of most psychological experiments. Instead, they actually illustrate distributed practice, since they employ daily cycles of rest and effort.
comparable to the 24-hour cycle sometimes used in distributed practice experiments. He also believed that extrapolations from the common experiments based on shorter minute or hour cycles seem risky; therefore, until more relevant experiments are undertaken, no conclusive comparisons are possible. Hefferlin (1973) did concede one point concerning distributed practice. He stated that despite lack of relevant research, at least one conclusion can be made regarding intensive instruction from the data on massed practice. This conclusion is that there seems to be a definite maximum amount that a person can learn in a given amount of time. He added that most people who run intensive courses are aware of this fact, and vary the kind of instruction and materials over different class hours.

Intensive Plans

One of the first intensive course schedules in the history of modern American higher education is the Hiram Study Plan of Hiram College in Ohio, conducted from 1934 to 1958 (Eckleberry, 1958). Hiram's Study Plan developed from economic necessity in the depression of the 1930s. A few professors wanted to earn a little extra money and suggested that they be allowed to offer intensively scheduled courses in the summer. These intensive summer courses were successful and led to an intensive course schedule for the full academic year in 1934.

At Hiram, the academic year now had four 9-week quarters. From 8:00 a.m. to 9:00 a.m. each morning, an hour was reserved for courses in subjects such as foreign language, since the language faculty in
particularly were adamant that foreign language could not be learned quickly. The hours of 9:30 a.m. to 4:30 p.m. were set aside for intensive courses.

After 2 years, some evaluation data were available on the effects of the new study plan. The Co-operative General test scores of the seniors graduating in 1936, who had spent 2 years under the plan, were significantly higher than those of the seniors who graduated in 1933 (Brown, 1940). The plan was endorsed by the student body, and it was kept until 1958. In 1958 the faculty voted to return to the traditional concurrent course scheduling; the apparent reason for wanting to return to a traditional schedule was to be in step with other colleges in the country (Powell, 1976).

It is interesting to note that in September 1977, Hiram returned to some intensive scheduling, primarily from economic necessity (Dressner, 1978); they initiated a weekend college to attract the nontraditional student to their campus.

The weekend classes are offered between Friday evening and Sunday morning on alternate weekends. There are six weekends of classes in a term and three 11-week terms comprising the academic year. Hiram's officials stated that they recognize the demand and capability of adults for concentrated learning, and schedule each course in two 2-hour periods per weekend (Dressner, 1978).

At the Harvard Graduate School of Education, experimentation has been done with the teaching of courses using an "intensive" classtime format (Lasker, Donnelly, & Weathersby, 1975). Classes are held over selected weekends during the academic year, 9:00 a.m. to 5:00 p.m.,
Friday through Tuesday. These courses are called "intensive" because they take place in concentrated time blocks. It has been concluded that the positive attributes of the intensive format are as follows:

The intensive course seems well-suited to practicum experiences, simulations and learning that involves personal reflection. The format seems to foster a special kind of learning environment in which there is high involvement, a variety of learning experiences, time for conceptions to develop and mature, and the opportunity for students to explore their reaction to ideas and arrive at their own synthesis of material. (p. 11)

The program has some stated deficiencies (Lasker et al., 1975). It can accommodate only a limited number of students, can consume much time and energy, and can conflict with other courses. The intensive course format requires a great deal of planning and special design skills. The format places an unusual set of demands on the instructors, and requires an ability to feel at ease leading a group process. It was stated, "All students may not be interested in the intensive format because of the extra complexities it brings to the classroom; . . . it would not be an appropriate vehicle for all subjects" (p. 11).

Anderson (1982) supported an intensive course time schedule for high school classes. As opposed to the daily 50-minute classes, the intensive schedule involves scheduling students into one daily class at a time, usually from 3 to 4 hours each day for approximately 4 or 5 weeks. The student taking a course under this format would be exposed to a subject matter for the same amount of time as a student exposed under the traditional concurrent method. Anderson (1982) supported the intensive schedule, concluding,
These students would have the opportunity to become highly immersed, emotionally and intellectually, in a particular subject. Students who have not been especially highly motivated would find a different environment with which to deal. They could no longer be uninvolved. It is expected that there would be more student-teacher interaction. (p. 28)

Related to the variation of the classtime schedule is the manipulation of the academic calendar.

Academic Calendar

Most colleges and universities organize their academic terms using either a semester system or a quarter system. The semester is 15 weeks in length while the quarter is 10 weeks in length.

In an article, "Academic Calendar and Academic Change," Rabinowitz (1981) stated that in 1960 Pennsylvania State University changed from the semester system to the quarter system. The change was brought about by presidential decree. Under the quarter system the academic year was divided into four quarters. Classes were divided into 75-minute periods and the credits earned were regarded as semester credits. Rabinowitz (1981) stated the 75-minute class period was unpopular with many of the faculty who were firmly convinced that the upper limit of the attention span is less than 1 hour.

In 1980, the current president of Pennsylvania State University proposed that they return to the semester calendar. Proponents of the semester calendar argued that the 10-week term is too short to teach complex material effectively. They stated students master and integrate instructional content imperfectly because they lack the
necessary time to process and reflect. A 15-week semester would provide the needed time. Rabinowitz (1981), an educational psychologist, stated that a search was done for studies concerning the effects of different calendars on students' learning. He went on, "Unfortunately we know of no trustworthy studies of calendar effect" (p. 2). Rabinowitz (1981) generalized that some professors in educational psychology see the advantage in a 15-week semester by the conclusions based on experience, not research. He also stated that a calendar change probably has no uniform effect on student learning because students will adjust to change differently; some students would use the new calendar to process material more effectively, but for students who confine their studying to the night before an examination, no positive effect should be anticipated. He concluded his article by stating, "A change in the academic calendar does not begin to tax the ability of faculty and students to adapt" (p. 2).

Weekend classes are a further variation of the college calendar.

Weekend College

Sutherland (1980) has defined "weekend college" as a college or university offering credit leading to a degree primarily, if not exclusively, on weekends. Weekends will include Friday evenings, Saturdays, and Sundays. Sutherland (1980) surveyed 13 colleges and universities offering weekend college programs with respect to their class meeting configurations and other factors. These weekend schedules are intensive, as each class meets for relatively long periods of time on the weekends, as opposed to a concurrently scheduled class.
that meets just 50 minutes per credit hour per week for the 15- or 16-week semester. From the survey questionnaire, Sutherland (1980) found that the relatively long class periods had generally been perceived as advantageous for the student and faculty. The student accomplishes more at one time, has an opportunity to discuss the course during breaks and lunch with the instructor and fellow students, and in general, forms a warmer bond with the other students and the faculty member.

Specific conclusions cannot be drawn from the results of the survey questionnaire, as Sutherland (1980) did not provide the methodology by which the survey was concluded. He stated that a list of institutions with weekend college was obtained from "periodicals." He also stated that the response to the questionnaire was very poor with only 13 institutions answering the survey questionnaire. The results of the work can only provide an indication of what may be the actual situation at colleges.

Stashower (1974) stated that a faculty member has to adjust his presentation for the weekend college, but this adjustment usually makes the presentation more dynamic.

An article written by Carr (1970) stated colleges were being accused of compromising academic integrity in an effort to attract enough students to maintain financial viability. This point has been echoed by R. Fisher (1977), president of the John F. Kennedy University, and Sawhill (1978), president of New York University. Zeik (1980) claimed that college academic integrity does not have to be compromised by institutions when trying to maintain and increase
enrollments with the older adult students. He stated that courses scheduled to meet on weekends overcome some of the compromises that have been made in traditional programs where such practices as life experience credit and independent studies have been overdone. Both Sawhill (1978) and R. Fisher (1977) were primarily concerned with the over-use of life experience credit and independent studies.

Time and Learning

Carroll (1963) presented a conceptual model for learning which contains five elements "affecting success in school learning and the way they interact" (p. 723). The elements to be considered are:

1. aptitude—the amount of time needed to learn the task under optimal instructional conditions,
2. ability to understand instruction,
3. perseverance—the amount of time the learner is willing to engage actively in learning.
4. opportunity—time allowed for learning,
5. the quality of instruction—a measure of the degree to which instruction is presented so that it will not require additional time for mastery beyond that required in view of aptitude. (p. 729)

Carroll viewed the time factors as most easily measurable, while quality of instruction as most difficult to measure. His model has served as a basis for much of the later research on time and learning.

Studying time on task, Bloom (1974) concluded that "students become more efficient in their learning under favorable conditions and that students become more and more alike in their learning efficiency as measured by time devoted directly to the learning effort" (p. 688). Extra time and help in the early stages of learning, he contended, has a different effect than "an equal amount of time and
help at a later stage" (p. 685).

Wiley and Harnischfeger (1974), picking up on earlier studies, emphasized that the quantity of time spent in schooling is as important as quality. They concluded that the quantity of time has a direct effect on the amount of achievement. The more time spent on schooling, the greater the learning. In work done by C. Fisher, Berliner, Filley, Mariliave, Cohen, and Dishow (1981), a measure of student learning was developed using observable student behavior. This measure of student learning is called academic learning time (ALT) and is defined as the amount of time a student spends engaged in an academic task that can be performed with high success. The more ALT a student accumulates, the more the student learns. C. Fisher et al. (1981) found that the amount of time teachers allocate to instruction in a particular curriculum, content area is positively associated with student learning in that content area.

Fredrick and Walberg (1980) concluded that,

Time devoted to school learning appears to be a modest predictor of achievement. For some types of new material, when other variables are experimentally or statistically controlled, time may be the best predictor. . . . When material is familiar, often taught, or imprecisely measured, then time may appear weak and insignificant. To the extent that additional time is used to make up partially for ineffective instruction or inability it may even be negatively correlated with achievement. (p. 193)

Fredrick and Walberg (1980) also stated that there are modest relationships between the time length of the school day and achievement.
Student Learning

A University of Minnesota study (Kanun, Ziebarth, & Abrahams, 1961) was done to determine if there was a difference in the achievement of students taking a regular concurrent course as compared to students taking the same course during the intensive summer session. Student achievement was measured by the results on the usual final exam, and no significant difference was found ($\alpha < .10$).

A similar study was done at Indiana University. The study was a comparison of the academic achievement of students enrolled in nine courses in the intersession of 1963 and that of students enrolled in the same course in the spring semester of 1962-1963.

In this study it was hypothesized that there was no statistically significant difference in the achievement of the students in the spring semester courses as compared to the achievement of students in the intersession; course achievement was measured by the final marks earned by the students. The sample consisted of 1,016 students in 11 courses.

In the intersession, a student could enroll for either a 2- or a 3-semester-hour course, for which he was expected to devote full-time study. During the intersession, a 3-semester-hour course normally meets 180 minutes a day for a total of 2,340 contact minutes. During an academic semester, the same type of course normally meets for 135 minutes each week for a total of 2,295 contact minutes.

Richey, Sinks, and Chase (1965) found no significant difference in achievement, at a .01 level of significance, in 7 of the 11 course
groups. In 3 of the 11 course groups, achievement in the intersession significantly (.01 level of significance) exceeded achievement in the spring semester, while in the remaining course, achievement was significantly higher in the semester group than in the intersession group.

Morel (1971) has written about a "Total Immersion Language Program." In this high school program, two to four periods per day were devoted to language instruction and language practice. In addition to the regular Spanish courses, courses in world history, humanities, and civilization were used to expose the students to the foreign language and culture. In these "nonlanguage" classes, which explored such topics as sociology, economics, literature, and government, Spanish became the primary medium of communication. The students were in the program for 3 years. The test results for the 3 years show that the students in the Total Immersion Language Program were more proficient in Spanish than were other students in the same school, and in the nation generally. Their scores were consistently above those of comparison groups on all aspects of language learning—speaking, writing, listening, and reading.

Knowles (1972) has conducted research considering the question, "Is the intensive session as effective as the regular program?" (p. 109). According to Knowles (1972), this work was done because many colleges are trying to meet the educational needs of working adults by varying the traditional class meeting time schedule.

For example, a class that normally meets twice a week for two-hour sessions might be presented in a straight seven- or eight-day intensive pattern. As long as academic
standard on time requirements are met, and local institu-
tional administrators agree, this sort of intensive pro-
gram could become extremely popular with many students.
(p. 108)

Knowles (1972) stated that in the

consideration of the intensive learning experience com-
pared with normal class procedure, the major variables
that would produce a difference in the attained level of
achievement might be time and fatigue. For advanced stu-
dents, is there any difference in mass versus distributed
learning? Does the intensive class allow for sufficient
time in terms of reflective thought processes leading to
insight in theories? Does the individual student become
fatigued to the extent where he can no longer attend?
Does the level of learning drop off? (p. 109)

Knowles's study was conducted at the School of Public Adminis-
tration of Southern California, which offers an "intensive semester."
The format for these intensive courses normally is all-day sessions
for 8 straight days, or a split of 4 and 4 days with a month to 6
weeks intervening. The amount of class time is identical for each.
A regular class of 18 students and two intensive classes of seven and
eight students, respectively, formed Knowles's study sample. All
sessions were taught by the same instructor, so the class procedures
were the same for the three classes in the study.

In this particular study, the regular session students attended
15 weekly classes of approximately 3 hours each, while the intensive
groups met in a 1-day, 3-day pattern, with a 3-week separation; these
full-day sessions normally lasted 7 hours. Because of the nature of
the study, random assignment was not possible. Therefore Knowles
(1972) collected demographic variables on each subgroup and compared
these variables. He stated that there were no statistically signifi-
cant differences between groups with respect to age, number of units
being taken that semester, total number of graduate units completed
toward the degree, Graduate Records Examination verbal and total
scores, number of semesters since having taken a statistics course,
statistics course grade, current graduate school grade point average,
or the number of hours employed each week.

Knowles (1972) went on to state that "since no difference was
found between the spring and summer intensive groups, it was assumed
that they represented the same population, and they were combined
into one experiment group" (p. 111). Also, no difference occurred
between the experimental and control groups, which were assumed to be
evenly matched at the start of the study.

In the discussion of the study results, Knowles (1972) stated:

Upon considering the statistical findings in comparing
the two groups, it appears that the variable of time and
fatigue had no more effect on the students in the intensive
class than in the regular session.

It may be concluded, therefore, that in this case
the two course formats were comparable in terms of academic achievement. It would appear that fatigue effects
that accompany massed learning do not necessarily inhibit
performance. Rather, it may be that given a sufficiently
highly motivated student, the exact nature of the format
does not relate to achievement. (p. 113)

Summary

Most colleges and universities use a concurrent course schedule.
The concurrent class meeting time schedule developed with the begin­
nning of the elective college course system that came into being in
the later part of the 19th century and early part of the 20th cen­
tury. The concurrent or traditional class meeting schedule is not
based on learning theory but rather was introduced for bureaucratic convenience (Gerhard, 1955).

There has been some experimentation by schools with class meeting time schedules that vary from the traditional schedule. The laboratory experimentation includes massed versus distributed practice and time and learning. The field work, such as done at Hiram College, has been concerned with condensing a normal 15-week semester class meeting time into a much shorter period, for example, 3 weeks. Classes meet for the same number of hours as under the traditional format but for fewer than 15 weeks; this has been called an intensive schedule.

From this review of related literature there does not seem to be any conclusive evidence of how a variation from the traditional course schedule may enhance or be a detriment to student achievement. The hypothesis of this research is that there is no difference between the two class meeting schedules with respect to student achievement.
CHAPTER III

METHODOLOGY

Introduction

The purpose of this research project was to compare the achievement of course objectives by students taking a course on weekends to the achievement of students taking the same course following a traditional concurrent class meeting time schedule. This chapter includes the following sections: research design, independent variable, dependent variable, data collection, hypothesis, and analysis.

Research Design

This research compared the achievement of students taking courses on weekends to that of students taking the same courses on a traditional concurrent time schedule. Nested under each time schedule are the three courses which were selected for this project: Management of Organizations, Business Law, and Labor-Management Relations. The achievement of students in the two schedule groups were compared by a posttest at the conclusion of the course.

The three courses were selected from the Fall 1983 schedule at Nazareth College, Kalamazoo, Michigan. Two sections of each course were chosen for this project, one meeting on weekends and the other meeting on a concurrent schedule, each with the same title and covering the same material. Each of the six classes had a different
instructor to eliminate any instructor bias favoring one time schedule or one class section over the other. Because of this process, the courses were not randomly selected.

The students in this research project were self-selected according to the course schedule they designed for themselves at the beginning of the college semester. Although there was a risk that the two groups of students (weekend group and concurrent group) may not have been similarly distributed with respect to age, gender, grade point average, or accumulated credit hours, it was not possible to randomize because of individual time constraints.

However, Knowles (1972) found no significant difference between students in an intensive session as compared to those in a regular program in demographic and aptitude variables in terms of age; number of units being taken that semester; total number of graduate units completed toward the degree; Graduate Record Examination verbal, quantitative, and total scores; number of semesters since having taken a statistics prerequisite course; statistics course grade; current graduate school grade point average; or number of hours employed per week. Because of Knowles's work, differences are not expected between the weekend and the concurrent groups of the study.

In this study the demographic variables used to establish similarity of the two groups were age, gender, GPA, and credit hours accumulated to date; these variables are the same or similar to those used by Knowles. Some of the other variables used by Knowles, Graduation Record Examination scores, number of semesters since
taking statistics, and statistics grade, were not appropriate for use
with this undergraduate study population.

Independent Variable

In this research comparing the course objective achievement of
students taking courses on weekends to that of students taking
courses on a traditional concurrent schedule, the independent vari­
able was the class meeting schedule.

Three sets of two classes were selected as the experimental
groups of the study. In each set (course), one class met following a
concurrent schedule while the other followed a weekend schedule.
Each of the six classes was taught by a different instructor.

Experimental Groups

The concurrent class meeting time schedule, Group 1, met 2-1/2
hours per week from 5:30 p.m. to 8:00 p.m. for the 16-week semester.
The weekend classes, Group 2, met on Friday from 6:00 p.m. to 10:00
p.m., and Saturday from 8:00 a.m. to 6:00 p.m., with 1 hour off for
lunch. The weekend classes met on three alternate weekends. Both
schedules fulfilled the required time for three semester credit
hours, for which 45 hours of class time is standard.

Class Selection

One of three comparable courses were nested under each class
meeting schedule; the three courses were Management of Organizations,
Business Law, and Labor-Management Relations. Of the several courses
offered by the Management Division at Nazareth College, these three were selected because each course had a section offered on the weekend schedule as well as a section on a concurrent schedule, and because different instructors were teaching each section. Each of the three courses are taught with a lecture/discussion method of course content delivery, and all three courses have a social science as opposed to a quantitative base. A student in the business curriculum at Nazareth College may take these three courses in any order after finishing economics and accounting.

Instructor Interaction

At the time the instructors agreed to teach a course that was part of the research project, they were asked to sign an agreement (Appendix A). In signing the agreement, the instructor verified that he would follow the specific procedures designated for the research; these procedures provided a common emphasis for each pair of courses across the two research groups.

Each instructor agreed to identify 40 concepts that he believed should be addressed in the course. From these concepts, the two instructors teaching the same course agreed on the 10 most important concepts related to the subject matter of their course.

Each instructor also agreed to allow the project researcher to administer a student examination at the end of the course; the results of this examination contributed a 10% weight to each student's final examination grade. Common textbooks were used across treatment conditions.
The instructors agreed not to discuss the research with any students until all appropriate data had been collected. This instructor contract grew out of the research pilot project that was conducted in the Winter Semester of 1983.

Pilot Study

For the pilot study, three courses were selected that had sections offered both on weekends and on a concurrent schedule during the Winter Semester of 1983. The three courses were Micro Economics, Principles of Marketing, and Management of Organizations; each course had a different instructor. The only request made of the instructor was that he agree to develop, in conjunction with the instructor teaching the other section of the course, a comprehensive list of objective questions which would adequately determine the course objective achievement of the students. There was no written instructor agreement, but there was an oral agreement that the instructor would not alter the agreed-upon test.

In the concurrent Principles of Marketing class, the instructor altered the way in which students were to answer the research test questions. The instructor of the concurrent Personnel Administration class used some of the research test questions on other tests throughout the course. Thus, students in this section were provided with additional practice. The instructor of the concurrent Management of Organizations class did not cover in class or assign reading related to some of the agreed-upon concepts. Because of these experiences with the pilot project, the instructor agreement was
developed. This agreement contained provisions covering course concept development rather than examination question development, the percentage that the research project examination would contribute to the student's final examination grade, the textbook, and the non-discussion of the research project with people other than the researcher. It was hoped that this agreement would eliminate problems that arose during the pilot project.

Dependent Variable

The dependent variable in this research project was the achievement of course objectives by students in the two treatment groups. Achievement is a common concept across treatment; but within each treatment group, three different instruments were constructed.

Instruments

The instructors of each course included in the research project agreed upon 10 concepts related to the course objectives. For each of these 10 concepts, the project researcher chose three objective test questions from the publisher's instructor's manual that accompanies the text used in the course. In this manner, a test was developed for the course that included 30 objective questions covering the 10 concepts.

At the time the researcher administered the achievement test, he also asked the students to sign a statement (Appendix B) to determine if the course content did, in fact, relate to the preselected concepts that were to be covered in the course. This was to help the
researcher determine that the concepts agreed on by the instructors and included in the exams were actually covered in the course.

Three tests were developed, one for each pair of courses across treatments, and each consisting of 30 objective questions. Content validity was controlled by the use of the publisher's test questions for each text, as these questions were specifically written to test achievement of the text material. Content validity was further addressed by asking the opinion of an expert on whether the chosen questions were appropriate for testing these concepts. The expert was Thomas Breznau, Professor of Business Administration at Kalamazoo College, Kalamazoo, Michigan. Mr. Breznau has a master's degree in Business Administration, and he has taught all of the course subject matter included in the research project.

The internal consistency reliability of the three tests were measured with Kuder-Richardson Formula 20 (Stanley & Hopkins, 1972, p. 126).

Common Metric

Since there were three different sets of courses in the project, with the subjects in each course taking a different test, the test results had to be normalized. To do this, the results of each of the three separate tests were rescaled to a common metric, standard Z scores, i.e., the dependent variable raw scores were transformed to a normalized Z score within class but across conditions. The Z scores were calculated within each of the three courses, including both the night and weekend section in the calculation. The Z score represents

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a common metric or equivalent scale of the variable known as achievement.

**Demographic Variables**

The demographic information included in this project will provide information for future research comparison, as well as insight into the results of this project. Data concerning the students and the instructors were collected; these data were collected from Nazareth college student and instructor personnel records during the study period. This information delineated general characteristics of the student sample and instructor sample involved. Student data included age, gender, grade point average, and accumulated credit hours; means and standard deviations are presented for continuous variables (age, grade point average, and accumulated credit hours), while gender is presented by means of a contingency table.

Instructor data include status as a full- or part-time instructor, nonteaching work experience, and educational background; these data are listed for each instructor. By including demographic data, the reader will have a better understanding of the study and study results, while future researchers will be better able to compare this study to their own research. These data are presented with the findings of this research project in Chapter IV.
Data Collection

Dependent Variable

For the concurrently scheduled classes, the researcher attended the last class period to administer the research examination. For the weekend courses, the researcher administered the examination on the last Saturday afternoon of the class. In both cases, the research exam was given in conjunction with the final course examination. The researcher corrected the tests immediately and gave the results to the appropriate instructors. The actual tests became part of the research project data.

It should be noted that the final exam for the weekend classes were given late Saturday afternoon; these students had been in class Friday evening and all day Saturday. The concurrent classes took the tests on the last night of class, after having been engaged in other activities throughout the day. As these conditions are not identical, there could be a difference in fatigue between the weekend and concurrent treatment groups.

The original class list for each course section, as established by the Nazareth College Registrar, was compared with the list of students taking the final exam. Students who were on the initial class list who did not take the final examination were contacted by the researcher to try to determine the reason they did not take this test. This information is included in the research results.

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Student demographic data were collected from college records. Instructor demographic data were obtained from resumes and personnel records.

Data Processing

The data in the research project were coded in the following categories: student number, course, age, gender, GPA, accumulated credit hours, raw test score, and transformed standard Z score. The data were stored on the Western Michigan University computer and analyzed using the Statistical Package for the Social Sciences.

Hypothesis

The research hypothesis of interest is: There is no difference between the achievement of students taking courses on a weekend class meeting schedule at Nazareth College, Kalamazoo, Michigan, as compared to those taking the same courses following a concurrent class meeting schedule.

The null hypothesis of this project is the same as the research hypothesis; it states that the mean achievement of students in the concurrent time schedule is the same as that of students in the weekend schedule. The null and alternative hypotheses can be stated symbolically as:

\[
H_0: \mu_c = \mu_w = \mu
\]

\[
H_1: \mu_c \neq \mu_w
\]
where $\mu_c$ is the mean of the concurrent schedule treatment group, $\mu_w$ is the mean of the weekend treatment group, and $\mu$ is the overall mean.

The raw test scores were transformed to standard $Z$ scores as previously discussed. These transformed $Z$ scores were analyzed using the two-sample $t$ test for independent means. The test was two-tailed; results were considered statistically significant if the resulting $p$ value was less than or equal to .20. The usual case for hypothesis testing is that the research hypothesis would be the same as the alternative hypothesis, $H_1$; in this case, one would prefer to reject the null hypothesis. In this study, however, as the research hypothesis is the same as the null hypothesis, it is preferable to accept the null hypothesis. Because of the way the hypotheses were set up for this study, it was decided to use a significance level ($\alpha$) of .20. The reasoning for this choice is described below.

The Type I, or alpha, error is the probability of rejecting the null hypothesis when in fact it is true or, with respect to this study, concluding that the concurrent and weekend groups are different when they are the same. The Type II, or beta, error is the probability of accepting the null hypothesis when in fact it is false, or concluding that the weekend and concurrent groups are the same when they are different (Iman & Conover, 1983). In this study, if an alpha error is made, the consequence would be the necessity of doing further research into the achievement of students taking weekend and concurrently scheduled classes, as one study would not provide enough research to cause a change in the program schedule. On
the other hand, if a beta error is made, the consequences would be to continue the weekend classes as presently designed under the false assumption of equal achievement. Therefore, the beta error is less desirable in this case and should be controlled as much as possible. With a fixed sample size, raising the level of significance (alpha) reduces the probability of committing a Type II (beta) error (Iman & Conover, 1983); for this reason, alpha was set at .20. It would be more desirable to err in the direction of doing further research than to err in the direction of maintaining the status quo when it is based on a false assumption.
CHAPTER IV

PRESENTATION OF DATA

Introduction

This chapter includes discussions centering on the following six categories: (1) demographic data with respect to the students in the study, (2) comparability of groups with respect to demographic statistics, (3) a student statement concerning agreement between course content and the achievement test administered, (4) information about the instructors involved in the project, (5) results of the achievement test, including reliability of the testing instrument, and (6) hypothesis testing.

The hypothesis of the study was that there is no difference between the achievement of students taking courses on a weekend class meeting schedule as compared to those taking the same courses following a concurrent class meeting schedule.

Demographics

Random assignment of students to each course and class meeting time schedule in the study was not possible because the students involved selected their own course and meeting time. Therefore, selected demographic variables were reviewed for each course and schedule for dissimilarities at the initiation of the study. The demographic variables examined in this study were gender, age, grade
point average (GPA), and college credit hours accumulated to date. These data were stratified by schedule, class, and class and schedule.

**Demographics by Independent Variable**

Seventy-one students enrolled in these classes were included in the study (see Table 1). Demographic variables were examined when the students were divided into the independent variable groups (weekend versus concurrent) to display similarities and differences between the two groups. Of these students, 46 were enrolled in the weekend courses and 25 students were enrolled in the courses that met on a concurrent schedule. In the weekend course 24 students were male and 22 were female, while in the concurrent courses 11 students were male and 14 were female.

Data with respect to age, GPA, and accumulated credit hours were gathered from college student records (see Table 1). There were data for 39 weekend students and 22 students enrolled in concurrently scheduled courses. The college does not have complete records for 7 students enrolled in weekend courses and 3 students enrolled in concurrently scheduled courses. The reason for the incomplete records of some students is because students may enroll in a limited number of courses at Nazareth College without formal admission to the college. The above demographic data are required only of students as part of the formal admission process, so data were not available for some students who had not been formally admitted to the college.
Table 1
Student Characteristics Displayed by Schedule

<table>
<thead>
<tr>
<th>Variable</th>
<th>Weekend group</th>
<th>Concurrent group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>24</td>
<td>52</td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
<td>48</td>
</tr>
<tr>
<td><strong>Program</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>38</td>
<td>97</td>
</tr>
<tr>
<td>Nursing</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Social Psychology</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Liberal Arts</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>General</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>36.10</td>
</tr>
<tr>
<td><strong>GPA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>3.52</td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>39</td>
<td>76.92</td>
</tr>
</tbody>
</table>

\( ^a \)4.0 point scale.
The mean age of students enrolled in the weekend courses was 36.10 years (see Table 1). The mean age of students enrolled in the concurrently scheduled courses was 27.68. It should be noted that the mean age of both groups is well above the traditional college student age of 18 to 22 years, indicating an older, nontraditional student.

The mean accumulated GPA of the weekend student group was 3.52, with a minimum of 2.57 and a maximum of 4.00 (see Table 1). The mean accumulated GPA of students in the concurrent course schedule group was 3.14, with a minimum of 2.20 and a maximum of 4.00.

From Nazareth College records it has been determined that most nontraditional students do not enroll at the college as freshmen. The average nontraditional student enters the college at the junior class standing level (Woodin, 1981). The GPA that has been accumulated at colleges other than Nazareth is not part of the Nazareth GPA. Because these earlier grades are not included in the GPA computations, the GPA of nontraditional students may be inflated as opposed to traditional students who have done all of their college work at Nazareth. Therefore, both groups have GPAs that are inflated.

In reference to accumulated credit hours, the mean of the weekend student group was 76.92 hours; the minimum number of accumulated credit hours in this group was 3.00, while the maximum was 129.00 credit hours. The mean of the concurrently scheduled group was 87.32, with a minimum number of credit hours of 35.00 and a maximum of 132.00 (see Table 1). In the examination of the data concerning
accumulated credit hours it was found that two subjects had accumulated only three credit hours, which is unusual for nontraditional students (Woodin, 1981). Both students in question were in one weekend class. When these two subjects are removed from the data, the mean number of accumulated credit hours of the weekend group is 82.49, and the mean number of accumulated credit hours of the concurrent groups remains the same at 87.32.

Thirty-eight of the 39 students in the weekend group were in the business program, while the other student was in a liberal arts program. Seventeen of the 22 students in the concurrent group were in the business program, two were in the nursing program, one in the social psychology program, one in liberal arts, and one in the general studies category (see Table 1).

Specific Course Within Treatment Group

In the examination of student demographic characteristics when displayed by class nested within group, the data can be summarized as follows.

There were 4 males and 3 females in the weekend Labor-Management Relations class and 5 males and 3 females in the concurrently scheduled Labor-Management Relations class. In the weekend Management of Organizations class there were 14 males and 11 females, while the concurrently scheduled class included 5 males and 7 females. The weekend Business Law class included 6 males and 8 females, while the concurrently scheduled course section had 1 male and 4 females. The higher proportion of females in the makeup of the concurrently
scheduled Business Law class as compared to the other Business Law class should be noted.

The mean age of the weekend students in the Labor-Management Relations class was 42.7 years, and the mean age of the concurrently scheduled students was 27.4. The mean age of the weekend students in Management of Organizations was 33.9, while the mean age of the concurrently scheduled students was 26.8. The mean age of the weekend Business Law class was 36.2, and the concurrently scheduled group had a mean age of 32.0. In the review of the groups on the age variable, the following should be noticed with respect to the mean age of students in the Labor-Management Relations class, 42.7 years for the weekend students as compared to 27.4 years for the concurrent students. Although both groups represent a nontraditional student age group, the students in the weekend class were considerably older that those in the concurrent class. In each of the three class groups studied, there was a trend for the weekend students to be somewhat older than the concurrent students (see Table 1).

The mean GPA of the weekend students in the Labor-Management Relations class was 3.7, while the concurrently scheduled group had a mean GPA of 3.4. In reviewing mean GPA between the two different groups in the Management of Organizations class, it was found that the mean of the weekend group was 3.4 and the mean GPA of the concurrently scheduled group was 3.0. In the Business Law classes the mean GPA of weekend students was 3.6, and the mean GPA of the concurrently scheduled class was 3.0. In both the Management of
Organizations and the Business Law class groups, the weekend students had a mean GPA that was approximately half a point higher than the concurrent group. Although the difference in the Labor-Management Relations class group was not as pronounced, the weekend students still had a higher mean GPA.

Reviewing the weekend group to the concurrently scheduled group in the Labor-Management Relations class, with reference to accumulated credit hours, it was found that the mean for the weekend group was 98.1 and the mean of the concurrently scheduled class was 98.3. In the Management of Organizations class the mean accumulated credit hours for the weekend group was 74.6, while the concurrently scheduled group had a mean of 68.9. The weekend Business Law class had a mean number of accumulated credit hours of 68.5, while the concurrently scheduled group had a mean of 103.0, which is a substantial difference that should be recognized. Although these differences may imply somewhat dissimilar groups (weekend versus concurrent), it was not possible to control for these variables in the design of this study.

There is concern as to the internal validity of the study because of the differences in demographics noted above; results of the study should be interpreted with this in mind.

This information is summarized in Table 2.

Student Statement

Upon completion of the course achievement test, each student who participated in the study was asked to sign a statement verifying
Table 2
Student Characteristics Displayed by Class and Schedule

<table>
<thead>
<tr>
<th></th>
<th>Labor</th>
<th>Management</th>
<th>Law</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weekend</td>
<td>Concurrent</td>
<td>Weekend</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>4  57</td>
<td>5  63</td>
<td>14  56</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>3  43</td>
<td>3  37</td>
<td>11  44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Labor</strong></th>
<th></th>
<th><strong>Management</strong></th>
<th></th>
<th><strong>Law</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weekend</td>
<td>Concurrent</td>
<td>Weekend</td>
<td>Concurrent</td>
<td>Weekend</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>7  42.7</td>
<td>7.5</td>
<td>8  27.4</td>
<td>6.6</td>
<td>20  33.9</td>
</tr>
<tr>
<td><strong>GPA</strong></td>
<td>7  3.7</td>
<td>0.2</td>
<td>8  3.4</td>
<td>0.4</td>
<td>20  3.4</td>
</tr>
<tr>
<td><strong>Hours</strong></td>
<td>7  98.1</td>
<td>19.7</td>
<td>8  98.3</td>
<td>15.3</td>
<td>20  74.6</td>
</tr>
</tbody>
</table>

*a4.0 point scale.*
content coverage (Appendix B). Each student was given a printed statement to verify that the concepts that were the basis for the questions of the test administered at the end of the course were covered by the course instructor. Each student was to sign his or her name and give the name of the course and the instructor. Each student understood that this information did not go to the course instructor and was not part of the professional evaluation of the instructor. One hundred percent of the students indicated that the test did reflect the course content as taught by the instructor; therefore, in the opinion of the student, the test had content validity to the extent that students can globally judge the content and the measure.

Course Instructors

Each course was taught by a different instructor in an effort to compensate for any possible bias of having a single individual favor one course schedule over the other. In examining the number of years of full-time teaching experience, it was found that only one instructor in the group had substantial years of full-time teaching experience at the college level. The course he taught was Management of Organizations. The remaining instructors had at least 2 years of teaching experience and at least 2 years of teaching experience at Nazareth College. Each of the instructors teaching a weekend course had more previous experience teaching their respective course of the study than the concurrent instructors. The instructors teaching the concurrently scheduled classes had more related work experience than
the weekend course instructors. The weekend instructors have more years of teaching experience, which is reasonable since the weekend schedule is a more difficult teaching task. However, all have substantial work experience in their fields of teaching and all have similar levels of education.

Information pertaining to the six instructors involved in this study is in Table 3.

Table 3
Instructor Experience

<table>
<thead>
<tr>
<th>Course</th>
<th>Years full-time teaching exper.</th>
<th>Years of 1 class not full-time</th>
<th>No. of times teaching this class</th>
<th>Years of post-sec. educ.</th>
<th>Years of related work exper.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor-Management Relations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekend</td>
<td>0</td>
<td>6</td>
<td>12</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Concurrent</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Management of Organizations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekend</td>
<td>15</td>
<td>0</td>
<td>10</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Concurrent</td>
<td>0</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Business Law</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekend</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Concurrent</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>40</td>
</tr>
</tbody>
</table>

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Results

The hypothesis of this study was that there is no difference in the achievement of students taking comparable courses on weekends as opposed to a concurrent class meeting schedule. The procedure for the study was to administer an achievement test to each class of students that took part in the study. There were three groups of comparable courses in the study. Each group was given selected questions taken from the appropriate textbook publisher's test questions. The results from the publisher's tests were transformed into a common metric, standard Z scores.

The three achievement tests used in the study were tested for reliability with the Kuder-Richardson Formula 20. The results are as follows:

Labor-Management Relations: = .69
Management of Organizations: = .46
Business Law: = .69

Each of the three tests consisted of 30 objective questions.

In the interpretation of the above reliability coefficients, Diederich (1977) stated that "the reliability coefficients for classroom tests typically range between .60 and .80" (p. 142). Based on the above, reliability of two of the tests used in this study can be considered to be in the middle range, while the Management of Organizations test would be considered low; this should be noted when results are being reviewed by people in the field.
The analysis of the test results compared the achievement of students taking a course on weekends to those students taking the same course on a concurrent schedule. To test the hypothesis of the study, the transformed data (Z scores) were analyzed using the two-sample t test for independent means. The test was two-tailed and used a .20 level of significance.

The comparison of achievement in the weekend group and in the concurrent group is as follows. Each test is 30 items long; consequently, a perfect score is 30.

In the Labor-Management Relations course there were 8 students in the concurrently scheduled class and 7 in the weekend class. The mean score for the concurrent class was 28.50 (mean Z score = .32) and the mean score for the weekend class was 27.14 (mean Z score = -.37). The raw scores for this group show a ceiling effect in both classes in which the mean score is very close to a perfect score.

There were 9 students in the concurrently scheduled Management of Organizations class and 24 students in the weekend class. The mean score in the concurrent class was 21.22 (mean Z score = -.06), while the mean score for the weekend class was 21.46 (mean Z score = .02).

Five students took the test in the concurrently scheduled Business Law class, while 13 students were tested in the weekend class. The mean score for the concurrent group was 18.80 (mean Z score = -.54) and the mean score for the weekend group was 21.15 (mean Z score = .21). This information is summarized in Table 4.
Table 4  
Means and Standard Deviations of Achievement Test Scores by Class:  
Labor, Management, and Law

<table>
<thead>
<tr>
<th></th>
<th>Weekend</th>
<th>Concurrent</th>
<th>Grand mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>X</td>
<td>SD</td>
</tr>
<tr>
<td>Labor</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>7</td>
<td>27.14</td>
<td>1.07</td>
</tr>
<tr>
<td>Z score</td>
<td>7</td>
<td>-0.37</td>
<td>0.55</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>24</td>
<td>21.46</td>
<td>2.98</td>
</tr>
<tr>
<td>Z score</td>
<td>24</td>
<td>0.02</td>
<td>0.98</td>
</tr>
<tr>
<td>Law</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>13</td>
<td>21.15</td>
<td>3.00</td>
</tr>
<tr>
<td>Z score</td>
<td>13</td>
<td>0.21</td>
<td>0.96</td>
</tr>
</tbody>
</table>
All students originally enrolled in both sections of the Labor-Management Relations class and the Business Law class took the final achievement test used in this study. In the concurrently scheduled section of the Management of Organizations class, four of the students originally enrolled in the course did not take this achievement test. These students were contacted. It was found that they were not able to take the test at the last class schedule because of personal scheduling difficulties; consequently, they were not included in the final analysis. In the weekend section of the Management of Organizations class, five of the students who were originally enrolled in the class did not take the study achievement test. These five students were contacted. Four had dropped the course before the final weekend because of personal schedule difficulties, and the other person could not attend the last class meeting because of work schedule conflict. These five students were not included in the final achievement test results.

The four students who dropped the course had not really been part of the class as they did not attend more than one class meeting. The fifth student did not take the course final exam with the class. Even with the missing five students, the class consisted of 24 students, considerably larger than any of the other classes. Therefore, the overall test results should not be affected significantly. This dropout rate is normal for weekend classes at Nazareth College. Besides, drop out occurred in only one course of the three being studied.
In the overall comparison of students in the concurrently scheduled group to that of students in the weekend group, there is no statistically significant difference in achievement. Twenty-two students in the concurrent group and 44 students in the weekend group took the achievement tests at the end of their course work. The mean Z score for the concurrent group was -.03 and the mean Z score for the weekend group was .01; this difference is not statistically significant (p = .8654).

This information is presented in Table 5.

Table 5
Achievement Test Z Scores: Means, Standard Deviations, and p Value

<table>
<thead>
<tr>
<th></th>
<th>Concurrent</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>44</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X</td>
<td>.01</td>
<td>-.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>0.92</td>
<td>1.13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t</td>
<td></td>
<td>-.1702</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>df</td>
<td></td>
<td>64</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p</td>
<td></td>
<td>.8654</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Summary

Discussion in this chapter centered around six major areas. These areas include: (1) demographic data with respect to the students in the study; (2) comparability of groups with respect to demographic parameters; (3) a student statement concerning agreement between course content and achievement test administered; (4) information about the instructors involved in the project; (5) results of the achievement test, including reliability of the testing.
instrument; and (6) hypothesis testing.

The independent variable was identified as: (a) weekend schedule or (b) concurrent schedule for three different business courses: Management of Organizations, Business Law, and Labor-Management Relations. The dependent variable was student achievement in these courses.

There was one major hypothesis identified for investigation. This hypothesis was stated in the null form, and indicated that there would be no difference in student achievement for the two class schedules, concurrent and weekend.

Because of the nature of the study, the students involved could not be randomly selected; therefore, selected demographic variables were compared in an effort to establish the similarity of the study groups.

A two-sample \( t \) test for independent means was performed to identify if a difference between achievements existed. No statistically significant difference was found in achievement between the groups of the study (\( t = -0.1702, df = 64, p = .8654 \)).
CHAPTER V

DISCUSSION AND CONCLUSIONS

Introduction

The purpose of this study was to consider the comparison of the achievement of student groups in courses following a nontraditional weekend class schedule as compared to those following a more traditional concurrent class schedule.

In this chapter the findings of the research will be discussed. The limitations of the study will be considered as well as the value of the study and recommendations for future research.

Findings

When comparing an intensive 3-weekend course schedule to that of a concurrent 16-week course schedule, it is essentially the comparison of a form of massed versus distributed practice. The literature that was reviewed in Chapter II indicated that distributed practice generally enhances learning more than massed practice. It should be noted, however, that distributed practice can take place within a weekend schedule, thus providing the benefits of distributed practice learning in a massed practice schedule. While a weekend schedule usually attracts the nontraditional, older students, this was true for both schedules in this study. As Knowles (1972) pointed out, the older nontraditional student overcomes the disadvantages of an
intensive massed practice schedule through a strong motivation to learn.

The hypothesis of this research project was that there is no difference in the achievement of students taking courses following a weekend class schedule as compared to those following a concurrent class schedule. It was found that there was no statistically significant difference in the achievement of a group of students with a weekend schedule as compared to a student group following a concurrent schedule at the .20 level of significance. Therefore, it is concluded that there is no difference in the achievement of course objectives between the concurrently scheduled group and the weekend scheduled group.

When considering this conclusion, some limitations of the study should be kept in mind.

Limitations

This research was limited to one college and courses within one academic division in that college. The study does provide some indication as to the comparison of achievement of students following a weekend schedule to that of a concurrent schedule, but it does not provide a strong basis for generalizations to the entire college or other colleges and universities.

Because of the relatively small size of the enrollment at the college in the study, and because of student self-selection of course meeting schedules, there was a lack of randomization of the students to the two schedule groups; and there were small uneven study group
sizes. These two factors bring into question the statistical validity of the study. Demographic data of the study groups were presented with respect to several demographic variables; as discussed previously, there were some apparent differences among the groups. This contributes to some concern about the internal validity of the study.

Another limitation is the low reliability (Kuder-Richardson Formula 20) coefficient of .46 found for the Management of Organizations test. The other two tests used had coefficients in the middle range for classroom tests.

Another limitation of the study was the student dropouts and absences at the time of taking the achievement test, a condition which also occurred only in the Management of Organizations classes. If the test scores from these students had been included in the statistical analysis, the result might have changed the resulting data in the one course where this occurred. It should also be kept in mind when examining this study that there were some missing demographic data for some participants in the groups. Again these missing data could affect the comparability of the two groups.

Differences in student and instructor fatigue is another factor that should be considered as a limitation of the study. The weekend student group was given the achievement test late Saturday afternoon, after being in class Friday evening and all day Saturday. The concurrent group took the test at the beginning of the last 2-1/2-hour evening class meeting. Fatigue could have been a factor in the weekend course, although the recent presentation of the material could have been beneficial. The instructor of each weekend course
was probably somewhat fatigued on each Saturday afternoon, therefore, affecting his teaching. With these factors in mind the value of the study will be considered.

Value of the Study

Because of many cultural changes caused by sociological conditions in the United States, many colleges and universities are adopting a weekend schedule in addition to their regular schedule. This schedule varies drastically from the traditional concurrent course schedule that has been in practice for the last century in U.S. postsecondary education. The objective of this study was to provide research data for the evaluation and comparison of student learning when following a weekend schedule versus a concurrent class schedule. The findings of the research do not suggest that the nontraditional weekend schedule should be stopped; furthermore, it should provide some support for those who are investigating the adoption of a varied nontraditional course schedule.

This research is of value to many groups who are interested in the academic credibility of courses scheduled on weekends. Prospective students want to know that a degree based on weekend course work is as educationally valid as one based on traditionally scheduled coursework. Colleges offering such programs need assurance that their educational standards are maintained when offering courses on nontraditional schedules. Companies who support their employees' education need to know that the knowledge gained by their employees taking weekend programs is equal to that gained by taking
concurrently scheduled courses. Foundations and governmental bodies funding educational institutions need to be certain that they are funding sound educational practices. This research should help assure these groups that the weekend program is a valid addition to an institution’s academic schedule.

Nontraditional course scheduling is becoming common in institutions of higher education (R. Fisher, 1977). The University of Southern California has an intensive program (Knowles, 1972), and many schools, such as, Mundelein and Hiram Colleges, have weekend programs (Sutherland, 1980). This study of weekend versus concurrent scheduling at Nazareth College will add to the knowledge that is being gathered on student achievement under alternate scheduling systems.

Of equal importance, the research provides a skeletal study model for additional work that could add to the body of knowledge about student learning under nontraditional class schedules.

With these factors in mind, perhaps this research will encourage some educators to pursue innovation in course scheduling to accommodate changes in the postsecondary education student population.

Future Research Recommendations

The weekend college class schedule represents a departure from the traditional class meeting schedule. The educational outcome of this relatively new schedule should be continually tested. This research represents a study that can only be generalized to non-quantitative, social science type business courses offered in the
business division at Nazareth College. Research should be done in other academic divisions at Nazareth College and at other colleges and universities that are using a nontraditional course schedule. A consortium of colleges and universities could be formed with the purpose of conducting future research to add substance to the arguments in support of, or against, non-traditional course scheduling in relation to student achievement and to provide data to help plan further class meeting schedules. In future research, other variables that should be incorporated into this research design are age of students, long-term learning retention, other class schedule configurations, and the level of learning in the cognitive domain.

Two researchers (Edwards, 1917; Ruch, 1928) believed that different age groups learn better under different conditions. As both student groups in this study were of nontraditional age, future research of the nature found in this study should be done using traditional age students.

As stated earlier in this study, many researchers (Austin, 1921; Calfee, 1968; Gordon, 1925; Landauer, 1969; Peterson et al., 1963; Young, 1966) question if student learning recall in the long term under a massed practice or intense class schedule is as great as it would be under a distributed practice or concurrent class schedule. It would be very appropriate for future research to consider the long-term learning retention of students following a weekend class meeting schedule.
Future research should also be done where class meeting time schedules are considered other than the one used in this study. For example, the more common class schedule of meeting three times a week for one hour should be part of a study.

In the *Taxonomy of Educational Objectives*, edited by Bloom (1956), major classes of educational behaviors have been listed in hierarchical order for the cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. The research of this study was only concerned with knowledge in this hierarchy, suggesting that future research similar to this study should be done concerning the higher levels of the cognitive domain.

It would also be very beneficial for research to be done when the number of students in each course is larger than in this study, thus providing for more powerful statistical conclusions.

**Summary**

In this study the research hypothesis was accepted. But the limitation of the small, uneven sample sizes of the groups involved means caution should be taken when generalizing from these data. This research tends to support other work related to similar hypotheses (Knowles, 1972). It does not demonstrate that there is underachievement by student groups in courses scheduled on weekends, as opposed to the more standard concurrent class schedule; therefore, postsecondary administrators can proceed with caution with a weekend course schedule. But, because of the increasing number of weekend course schedules and the need to innovate in class scheduling,
research should be continued to verify the maintenance of post-secondary academic integrity.
Appendix A

Instructor Agreement
INSTRUCTOR AGREEMENT

Management Division—Nazareth College

Research Project

I, the undersigned, will come to an agreement with the instructor of the course paired with the course I am teaching with respect to 10 conceptual areas that are to be the basis of the course content.

I further agree to allow the administrator of the project to give my students a test at the time of the final examination. The test given by the administrator is to contribute 10% to the student's final exam grade.

I agree to use the textbook assigned by the administrator of the project.

I agree not to divulge to the students in the class that they are part of a research project.

Signature ___________________________ Date ____________
Appendix B

Student Statement
STUDENT STATEMENT
Management Division--Nazareth College
Research Project

The concepts that were the basis for the questions of the test that was administered by Mr. Woodin were covered by the course instructor.

Student Signature ________________________________________


McDowell, R. (1974). Meeting the needs of non-traditional students (Vol. 8, No. 4). Atlanta, GA: Southern Regional Education Board.


Woodin, N. (1981). The relationship between the number of previously accumulated credit hours and graduation success rate of the older students at Nazareth College. Unpublished manuscript.
