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A COMPARISON OF THE TRADITIONAL AND PASS/FAIL
GRADING SYSTEMS IN SELECTED UNIVERSITY
PHYSICAL EDUCATION ACTIVITY COURSES

By

Allen Franklin Glass

A dissertation presented to the
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A COMPARISON OF THE TRADITIONAL AND PASS/FAIL
GRADING SYSTEMS IN SELECTED UNIVERSITY
PHYSICAL EDUCATION ACTIVITY COURSES

APPROVED:

Graduate Committee:

Paul D. McClinton
Major Professor

R. L. Crayton
Minor Professor

Wallace R. Masler
Committee Member

J. Gerald Parchment
Committee Member

Stanley Hall
Chairman of the Department of Health, Physical Education,
and Recreation

Robert C. Allen
Dean of the Graduate School

ABSTRACT

A COMPARISON OF THE TRADITIONAL AND PASS/FAIL GRADING SYSTEMS IN SELECTED UNIVERSITY PHYSICAL EDUCATION ACTIVITY COURSES

By Allen Franklin Glass

The purpose of this study was to compare the traditional and pass/fail grading systems in selected university physical education activity courses. The intention of the study was not to change the traditional grading system just for the sake of change, but to study scientifically the feasibility of the pass/fail grading system.

The subjects were one hundred and sixteen university students attending one of the following three courses: team games and conditioning, circuit training, or intermediate tennis. Subjects in all three courses were given the Wear Attitude Test and Spielberger, Gorsuch, and Lushene Anxiety Test. Skill tests were also administered to all subjects. The team games and conditioning classes completed the Harvard Step Test, as modified by Hodgkins and Skubic. The circuit training class completed

Allen Franklin Glass

the Bench Press and the Twelve-Minute Run/Walk Test. The tennis class completed the Dyer Tennis Test.

A Groups by Pre/Post fixed A x B factorial analysis of variance with repeated measurements upon one factor was performed upon the data. In addition, the Pearson product-moment correlation coefficient was run on the relationship of the Harvard Step Test with the Wear Attitude and Spielberger, Gorsuch, and Lushene Anxiety tests. Additionally, the Spearman rank-order correlation coefficient was also computed on the data.

Major findings of this study were that pass/fail grading as compared to traditional grading does not increase the skill level or attitude of students. Also, it does not reduce the anxiety of students.

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Chapter 1

INTRODUCTION

STATEMENT OF THE PROBLEM

The relationship between aims of colleges and methods of evaluation, as expressed in terms of examinations or marks, must be identified early. The literature available indicated that the earliest examinations in American universities existed for the purpose of evaluating the factual performance and ability of a student about to be graduated. The first evidence of this type examination in the United States was found in a reference to Harvard College in 1646.¹ This early beginning of a grading system was most likely oral. The first record of a numerical grading scale at Harvard indicated that in 1830 an examination in rhetoric was marked on the basis of a twenty point scale.² Seven years later at the same institution mathematical and historical professors were on record as having marked on the basis of one hundred.

¹Mary Lovett Smallwood, An Historical Study of Examinations and Grading Systems in Early American Universities (Cambridge: Harvard University Press, 1935), p. 2.

²C. H. Smith, "Yale University," Universities and Their Sons, ed. J. L. Chamberlain (Boston: R. Herndon Company, 1900), p. 89.

From this early beginning the pass/fail concept was established nearly one hundred twenty years ago, but widespread acceptance of the option was relatively recent. When the option was available to undergraduate students, the students were usually limited to courses outside their major field. In 1951 while most colleges were using numerical scales, students at the University of Michigan were evaluated on a pass/fail basis. Michigan was one of the first to abolish the traditional marking system.³

Middle Tennessee State University was founded in 1911 and since that time the only grading system utilized was the traditional system. There was no evidence of a pass/fail system being utilized or attempted. Therefore, the purpose of this study was to compare the traditional grading system with the pass/fail grading system in selected university physical education activity courses. This study was unique in that no other study has addressed itself to the comparison of these two grading systems at Middle Tennessee State University. The intention of this study was not to change the current grading system just for the sake of change, but to scientifically study the feasibility of the pass/fail grading system. The results of this study were made available to the Middle Tennessee

³"Pass/Fail--What Are the Trends," College and University, XLV (Summer, 1970), 484-506.

State University Health, Physical Education, and Recreation Departmental Chairman and to other appropriate Health, Physical Education, and Recreation Department faculty members for their consideration and study. The results also will be beneficial to university officials in their future study of grading systems.

IMPORTANCE OF THE STUDY

Physical educators have been entrusted with the most priceless product on earth, students. The individuality of students has required specific attention. The make-up of students has been found to be complex and unique in many ways. These students have been found to have varying abilities in the numerous physical and mental skills required of them by the culture they have inherited and have certain physiological limitations. Some students can handle a more difficult course of instruction than others. In view of this situation how has the teacher selected the proper program for each student? The teacher has accomplished the selection of the proper program through the use of evaluation and measurement techniques. Traditionally, the student had been informed of his accomplishments through the traditional grading system. It is hoped that the pass/fail grading system will allow the teacher to grade the student more as an individual.

In the past when grades have been given, they have been based on the achievement of objectives. These objectives should be clear in the instructors' and students' minds at the outset of the course so that the desired direction will be known. In physical education, the physical, motor, mental, and human relations objectives would all be kept in mind. It is hoped that this study will be of benefit to the physical educator in determining which method of grading will be more adequate in the determination of objectives to be met.

For the traditional grading system or the pass/fail grading system to work it has been necessary that several things occur. Physical educators have needed to realize that improvement in grading has not been a matter of mechanical change or accommodation to a specific situation. Physical educators have need of something other than the skills now possessed in grading students. There have been a number of areas in which additional information, skill, approaches, or understanding will be extremely helpful. Contract learning, independent study, pass/fail grading, and others are examples of these areas. This study will contribute to the understanding of what impact pass/fail grading will have on the improvement of the grading of students.

For example, physical educators should have been more aware of ways to measure the acquisition of attitudes and insights in addition to measuring factual material. Their concern should have been with the totality of the student instead of his ability to grasp fact after countless fact with little or no positive insight or attitude regarding these facts. Possibly the pass/fail grading system will reduce the emphasis placed on just knowing facts and allow the student to learn for the sake of learning and not for grades.

IMPLICATIONS FOR TEACHING

Teachers have needed a better understanding of the psychological implications of school marks, about motivation, and the impact of success and failure experiences. In order to assess a grading system properly so that a better learning situation is created, it is necessary to know the implications of grades on the students and to have marked accordingly. Some students are motivated by a given grade, others have become complacent, and still others have attempted through cheating and stealing exams to achieve the highest grades. Many students have become grade conscious and have failed to achieve the course objectives. It is hoped that the pass/fail grading system will reduce the cheating and stealing of exams.

The results of the pre- and post-anxiety test given in this study will assist teachers in the understanding of psychological implications of school marks. It is further desired that this study will have practical importance in the understanding of motivation and the impact of success and failure experiences. The results of the pre- and post-attitude test given in this study will assist in the understanding of motivation.

DELIMITATIONS

Delimitations of this study were as follows:

1. One class consisted of all males, one class consisted of all females, and one class consisted of males and females.
2. All subjects were delimited to college students who attended a regional university.
3. Teachers were aware that one of their sections was graded on a pass/fail basis and one section on the traditional system and that a mass testing system was utilized in administering all tests.
4. Two sections of team games and conditioning classes for women, two sections of intermediate tennis classes for women and men, and two sections of circuit training classes for men

at Middle Tennessee State University during the Fall Semester, 1972, were utilized. There were one hundred and sixteen subjects.

LIMITATIONS OF THE STUDY

For the purpose of this study the following limitations were noted:

1. A study of this nature had not been experienced previously at Middle Tennessee State University.
2. The hours the classes were taught may have had some effect on the performance of the students.

DEFINITIONS OF TERMS

For the purpose of this study the following definitions of terms were noted:

Activity course--a course in which the primary objective of the instructor is the development of motor skills by the student.

Anxiety--a state of uneasiness and distress about future uncertainties.

Attendance--a record of the number of times a student is present in a class.

Attitude--a state of mind or feeling with regard to some matter, such as grades.

Bench Press--the maximum amount of weight a subject can press using his arms from a supine position upon a bench.

Dyer Tennis Test--designed to measure ability in tennis. It consists of rallying a tennis ball against a backboard, attempting to score as many hits as possible within a thirty-second time limit.

Grading system--a method of indicating a student's level of accomplishment by the use of a mark.

Knowledge--familiarity, awareness, or understanding gained through experience or study.

Marks--a number, letter, or symbol used to indicate various grades of scholastic achievement.

Motivation--an incentive, inducement, or motive toward a specific goal.

Pass/fail grading system--a method of indicating a student's level of accomplishment by the use of either satisfactory or unsatisfactory.

Physical achievement--amount of improvement measured between the pre- and post-tests of selected skill evaluations.

Student evaluation--the examining and appraising of grading systems by students.

Teacher evaluation--the examining and appraising of grading systems by teachers.

Traditional grading system--a method of indicating a student's level of accomplishment by the use of a letter system, such as: A, B, C, D, F.

Twelve Minute Run/Walk--used as a cardiorespiratory endurance test. Distance covered in a twelve minute period is measured.

HYPOTHESES TO BE TESTED

The hypotheses tested in this study were:

1. There will be no significant differences between physical achievement in team games and conditioning, tennis, and circuit training classes when a traditional grading system or a pass/fail grading system is used.
2. There will be no significant differences among the traditional grading system and the pass/fail system in the determination of attitude toward physical education.
3. There will be no significant differences among the traditional grading system and the pass/fail system concerning the anxiety level of students.
4. There will be no significant differences among the traditional grading system and the pass/fail system as far as attendance.
5. There will be no significant differences among the traditional grading system and the pass/fail system in team games and conditioning, tennis, and circuit training courses as related to knowledge.

6. There will be no significant differences among the traditional grading system and the pass/fail system according to a teacher evaluation of these grading systems.
7. There will be no significant differences among the traditional grading system and the pass/fail system according to a student evaluation of these grading systems.

VARIABLES

The independent variable was the type of grading system: traditional or pass/fail. The dependent variables included the following: achievement in physical proficiency skill, achievement of knowledge, attitude, attendance, and anxiety.

Chapter 2

REVIEW OF THE LITERATURE

Much has been written concerning grading systems and the effects these grading systems had on students. A review of the evolution of grading practices indicated that student evaluation began as a non-graded system and gradually developed with the introduction of descriptive adjectives, numerical scales, and finally letter-grade systems. In recent years evidences have been toward a return to early practices of non-gradedness, thereby completing a cycle. Thus, the dichotomous grading systems implicit in the earliest colonial colleges have been paralleled by the contemporary versions of non-gradedness such as pass/fail and other similar approaches.

STUDIES RELATED TO PASS/FAIL IN PHYSICAL EDUCATION

Holt completed a study at George Peabody College in 1962 that was designed to determine the effects of grades and knowledge of results on physical fitness. The study was limited to sixty male students at Centre College of Kentucky and fitness as measured by the AAHPER fitness test. The experiment was conducted over a thirty week

period. Holt concluded that grades and/or knowledge of results did not cause an increase in physical fitness.⁴

Whereas Holt measured physical fitness Sidney B. Simon gave his views on grades saying that, "the grading system was the most destructive, demeaning, and pointless thing in education." Simon stated the only justification for grades was for certain administrative conveniences. It was his belief that when grades were abolished students were in pursuit of education instead of a pursuit for grades.⁵

In addition, Weber and Paul discussed approaches to grading in physical education. They felt the selection of a grading system was very important and they have compared some advantages and disadvantages in four currently used methods of assigning grades to pupils in physical education. They believed it was essential to first establish the educational objectives for the physical education program.

Weber and Paul considered four currently used methods of assigning grades to pupils in physical education:

⁴Calvin Spencer Holt, "The Effect of Grades and Knowledge of Results on Physical Fitness" (unpublished Doctor's dissertation, George Peabody College for Teachers, 1966).

⁵Sidney B. Simon, "Down with Grades," Today's Education, LVIII (April, 1969), 24.

(1) the relative method, (2) the absolute method, (3) the improvement method, and (4) the impressionistic method.

The relative method of grading, or grading on the curve, measured a pupil's progress as it compared with the performance of others in the class. The relative method was viewed favorably by evaluation experts because of its objectivity, consistency, and fairness. The use of this system should result in good students receiving high grades and poor students receiving low grades. The statistical sophistication of the relative method of grading assures higher reliability of measurement and a subsequent diminishing of errors. The disadvantages of the relative method of grading were that grading on a curve was incongruous with evaluation based on established objectives. This method often required certain students to receive A's, even though their level of achievement may not have been the quality of work that was normally described as superior. Another weakness of the relative method of grading was found in the fact that some facets of physical education were clearly pass/fail. In review of the advantages and disadvantages, the relative method of grading could be used in the evaluation of the cognitive skills, the intellectual aspects of physical education courses.

The absolute method of grading had advantages and disadvantages. The student had to attain a predetermined

standard to qualify for a specific grade. Percentage scores converted to letter grades, and pass/fail grades exemplified the absolute method. The absolute method had been very popular with teachers because of the simplicity of grade computation. Another strength was that students were evaluated in terms of their achievement and not influenced by the performance of others. Disadvantages of the absolute method were the element of subjectivity, which varied from one teacher to another. Another major fault was the unawareness of the measurement error that had existed in all examinations. The areas that were the most appropriate for the pass/fail method of absolute grading were the cognitive and psychomotor levels of learning to play sports.

The improvement method had shown a system of evaluation based upon the amount of progress a student had accomplished during a period of instruction. When the improvement method was used, the student felt motivated. He was not concerned with the relative class skill, but with his own attributes. A talented student experienced a disadvantage when he had achieved a high level on a beginning performance test and then found it difficult to show improvement.

Impressionistic grading began with the practice of assigning grades for behaviors that were not related to the specific objectives of that particular course.

Traditionally, these behaviors had been traits such as attitude, attendance, sportsmanship, effort, dress, and decorum. The importance of these traits was not questioned, but this method of grading was considered unreliable.

In conclusion, these authors had indicated all methods of evaluation are subjective to a degree; each instructor should select a method after serious study and then re-evaluate from time to time. The authors also pointed out that the pass/fail option was classified under the absolute method of grading.⁶

Additionally, Ellen Johnson gave some additional information about the development of the Reed College grading system. Reed College's approach had been somewhat different than many other schools. They had letter grades and a pass/fail system; however, they did not issue the grade reports to their undergraduate students or parents until after the student had graduated or been away from Reed for at least three years. The only exception was when a student was not doing well, and he was advised immediately of poor work.

The reason they began this system of not issuing grade reports was due to the belief of many of the faculty

⁶L. J. Weber and T. L. Paul, "Approaches to Grading in Physical Education," Physical Educator, XXVIII (May, 1971), 59-62.

that by not giving out comparative information on grades, the college would be able to stress the idea of working for the knowledge to be gained rather than in order to earn a specific grade. This policy of not issuing grade reports had been followed for over fifty years.

The students had always been encouraged to have conferences with their faculty advisers. The faculty adviser discussed the student's record with him in general terms, giving praise, encouragement, scolding, or any combination of these that seemed advisable in the light of the grade report and other information received.

This had been a very time consuming way of keeping students informed about their progress, but it had worked when both students and faculty made it work. Most of the Reed faculty and students felt it resulted in building a closer student-faculty relationship and at the same time placed major emphasis on the material to be learned in a course rather than on the grade to be earned.

There were both students and faculty who felt that even this method did not sufficiently de-emphasize the importance of grades. In the spring of 1966, a regulation was passed permitting juniors and seniors the option of taking courses on a pass/fail basis. In neither case was the grade used in grade point computation. This program was instituted in the hope that it would encourage students to take elective courses in areas outside their own field

to create more real breadth of program than has occurred sometimes in the past when students have occasionally worried about the adverse effect that taking a course outside their own special field of competence might have on a grade point average.

Small numbers of students had registered each year for pass/fail courses, and the Reed faculty had felt the program had been satisfactory and expected to continue the program.

Reed College has used the pass/fail system since 1966 and the system of not issuing grades for over fifty years to de-emphasize grades; the faculty indicated this has helped in accomplishing their aims.⁷

STUDIES RELATED TO PASS/FAIL IN OTHER DISCIPLINES

Baird and Feister reported a study in 1972 concerning grading standards and the relation of changes in average student ability to the average grades awarded. The Standard and Basic Research Service summary of the ACT yielded the basic data used in this study. A total of 2,217 colleges was used to collect the data for this study. Baird and Feister concluded that faculty members, at least

⁷Reed College, Portland, Oregon, personal correspondence between Ellen Johnson and Dr. John Weems, August, 1970.

collectively, prefer or are committed to a certain distribution of grades. Thus, faculties show an adaptation level by awarding, on the average, about the same average and distribution of grades, whether their current students are brighter or duller than last year's. The authors further concluded that results provide little evidence that faculties will adjust grades to correspond to changes in average student ability after some time lapse.⁸ Research by Aiken,⁹ Hills,¹⁰ Hills and Gladney,¹¹ Webb,¹² and Wilson¹³ indicated similar results.

Karlins, Kaplan, and Stuart completed a study at Princeton University in 1966-67. The study was concerned with examining performance in course work, and attitudes

⁸Leonard Baird and William J. Feister, "Grading Standards: The Relation of Changes in Average Student Ability to the Average Grades Awarded," American Educational Research, IX (Summer, 1972), 431-442.

⁹L. R. Aiken, "The Grading Behavior of a College Faculty," Educational and Psychological Measurement, XXIII (1963), 319-322.

¹⁰J. R. Hills, "The Effect of Admissions Policy on College Grading Standards," Journal of Educational Measurement, II (1964), 115-118.

¹¹J. R. Hills and M. B. Gladney, "Factors Influencing College Grading Standards," Journal of Educational Measurement, V (1968), 31-39.

¹²S. C. Webb, "Increased Selectivity and Institutional Standards," Research Related to College Admissions (Atlanta: Southern Regional Board, 1963), 53-61.

¹³Kenneth M. Wilson, "Increased Selectivity and Institutional Grading Standards," College and University, LXVI (1970), 46-53.

toward such work, as a function of grading systems that differed in their properties and in such a way provide some information on the relative merits of the two marking systems.

Educators have displayed hostility toward the competitive grading system prevalent in most schools. These educators based their opposition on several assumptions. Two major ones were:

1. Students did learn more in courses when the effects of competitive grading were reduced or eliminated.
2. Learning encouraged through incentives such as grades were not in keeping with contemporary educational philosophy which said a student should study because he was interested in the subject.

The unrest of educators opposed to the competitive grading system was of sufficient intensity that studies have been completed in several major universities.

Karlins, Kaplan, and Stuart allowed each Princeton student the option of taking one course per year on a pass/fail basis. Instructors were not informed which class members were taking the course pass/fail, and further, were instructed to treat all students alike. When the numerical grades for all class members were turned into the registrar,

the numerical grades of the pass/fail students were transformed into a "P" or "F."

The results of that investigation indicated that the pass/fail grading alternative was not the panacea that some educators envisioned. Based on undergraduate questionnaire data, the following summary statements concerning the attitudes of Princeton students were reported:

1. The majority of students exercised their pass/fail option to reduce grading tensions and increase additional study time in other courses rather than on the basis of interest in the course subject matter.
2. Students generally believed they learned more, worked closer to their capacity, and were motivated to learn more in a numerically graded course than one marked pass/fail.
3. Students believed they participated more fully in a course when faced with competitive rather than pass/fail grading.
4. Students believed that working for competitively assigned grades was tension inducing, but such grading also stimulated the students to work harder in their courses.

Based on academic performance data, the following summary statements concerning the Princeton pass/fail

system were reported. Students did equally well on their yearly grade point average regardless of whether or not they exercised their pass/fail option. Students had significantly better grades in their competitively graded courses than in their pass/fail subject.

The information reported here underscored the need for further study and re-examination of the pass/fail system. The urgency of this need was indicated in the rather unexpected responses of many students. If, indeed, students believed they learned more in competitively graded courses, then why should a pass/fail grading alternative exist at all? Two answers based on experimental findings were:

1. Some students did explore courses they would have ignored if faced with competitive grading.
2. Tension was reduced due to the elimination of competitive grading.

When time was a premium, pass/fail courses had to compete with numerically graded courses for a student's attention; and under those conditions it was most likely that a student did withdraw time from his pass/fail class and invested it in "dividend-paying," numerically marked courses. This was especially true at a school like Princeton where the undergraduates were accustomed to competitive grading and also had a high level of achievement motivation. In an academic system where all courses were marked pass/fail

or where students had sufficient time to devote to their pass/fail studies, a pass/fail grading alternative would probably come much closer to fulfilling the goals for which it was implemented.¹⁴

An additional study was completed by Gold and others in 1970 at Cortland College of the State University of New York.

The purpose of Gold's study was to evaluate the effects of both one-course and complete pass/fail grading on academic performance. The study involved students at Cortland College. Three groups of college freshmen were formed. Each freshman group consisted of students who had low, middle, and high Scholastic Aptitude Test Verbal scores, and they were matched according to sex. Group one took all courses pass/fail; group two took one course pass/fail; and group three was a control group. Juniors were matched by GPA and sex. Juniors were allowed to take only one course pass/fail. Students were informed as to which experimental group they had been assigned. Instructors were not told which of their students were to receive pass/fail grades. After final grades were submitted by the

¹⁴Marvin Karlins, Martin Kaplan, and William Stuart, "Academic Attitudes and Performance as a Function of Differential Grading Systems: An Evaluation of Princeton's Pass/Fail," The Journal of Experimental Education, XXXVII (Spring, 1969), 38-50.

instructors at the end of the semester, the grades were converted to pass and fail.

It was hoped that under pass/fail grading learning experiences might tend to be oriented away from rigid compliance with course assignments or cramming for examinations. This nonconformity could produce an initial deterioration in grades. However, insofar as a college education is cumulative, these independent learning experiences, if they occurred at all, should lead to improved academic performance as the accumulated wisdom was related to new courses. To test for such delayed effect the grades of the all-course pass/fail group were studied for the first semester in which they returned to traditional grading and again for the first semester of their junior year.

Students in the one course pass/fail failed to show significant improvement in their non-pass/fail courses. The one course pass/fail students had significantly lower grades in their pass/fail course than they did in their non-pass/fail courses.

Students in the all-course pass/fail group earned significantly lower grades than the control group during the first follow-up semester of conventional grading. For the second follow-up year the results were in the same direction but were not statistically significant.

The data suggested that what appears to be a trend toward pass/fail grading may be unwarranted. Students have learned how to work for grades and appear to learn a little in the process. It is as yet doubtful whether many have discovered how to learn without grades. To students who had been motivated by grades for years, pass/fail grading may represent only an escape from serious study. For this reason, pass/fail grading might prove more beneficial if instituted earlier in the student's career before grade motivation becomes an obstacle.¹⁵

Johnson further reported a study in 1970 concerning grading options. It was indicated that there was growing interest in the substitution of pass/fail for letter or numerical grades. Johnson's study confirmed that an increasing number of institutions had adopted this method of grading. The study also indicated the use of the letter or numerical grades in measuring academic achievement or intellectual accomplishment in courses had been periodically attacked. Some of the more common criticisms were that too much emphasis upon grades deters interest in learning and achievement; grades and grading often become a meaningless exercise in the false use of mathematics; assignment of grades encourages students to stay within

¹⁵Richard M. Gold and others, "Academic Achievement Declines under Pass/Fail Grading," The Journal of Experimental Education, XXXIX (Spring, 1971), 17-21.

the security of their major specializations and discourages them from exploring the academically unfamiliar, and grades, except as predictions of future academic work, cannot be meaningfully correlated with success in life.¹⁶

Johnson concluded the following:

1. Difficulties had arisen when pass/fail options were applied to the widely practiced distributive general education plan.
2. The pass/fail grading system had been most effective where certain offerings had been specifically designated as fulfilling this requirement.
3. Certain junior and senior offerings had been designated as pass/fail when general education had been viewed as stretching through the four undergraduate years.
4. The adoption of a pass/fail plan had offered an opportunity to provide students with written evaluations of their progress.

An additional study was reported by Quann in 1970 that indicated variations in grading trends. In an attempt to isolate new trends and options in grading, one hundred and fifty four-year colleges and universities were surveyed,

¹⁶Jack T. Johnson, "Evaluate Program, Not Grading," College and University, XLIX (September, 1970), 77-78.

one hundred and two offered pass/fail or a similar grading option, thirty had no grading option, six indicated that a system had been under serious consideration, and twelve failed to respond. Quann concluded that while pass/fail had been the more prominent trend in new grading techniques, the credit/no credit option, with complete elimination of the concept of failure, had been the emerging pattern. If taken collectively, these new grading techniques had been daring and innovative in theory, but with few exceptions were most conservative in their application. Consequently, it was difficult to determine whether the new options had been intended as a panacea to cure the ills of traditional grading or a placebo to placate restive students and faculty.¹⁷

Although Raymond Hewitt,¹⁸ in a study of twenty-two colleges and universities with pass/fail options, found that the institutions determined that a failing grade affected the grade point average, 56 or 54.9 percent of the institutions in Quann's study determined that a failing grade does not affect the grade point average.

¹⁷Charles J. Quann, "Survey Shows Variations in Grading Trends," College and University Business, XLIX (September, 1970), 78-79.

¹⁸Raymond G. Hewitt, The Status of Pass/Fail Options at Twenty-Two Colleges and Universities, Office of Institutional Studies, University of Massachusetts, 1967.

Research studies over the years have consistently cited inadequacies of traditional grading. Starch and Elliot,¹⁹ Rugg,²⁰ Spence,²¹ Lampson,²² Hoyt,²³ and Marshall,²⁴ are a few that have been critical of letter grading, but their studies have resulted in few substantial changes. On the other hand, the pass/fail concept, while only recently institutionalized, appears as a promising alternative to traditional grading.

Mathew R. Sgan completed a study at Brandeis University of the pass/fail system, which went into effect in 1966-67. The purpose of the study was to make a quantitative and qualitative investigation of the impact of pass/fail. Sgan wanted to find out what the impressions were about the operation from those who had been involved in the

¹⁹Daniel Starch and E. C. Elliot, "Reliability of the Grading of High School Work in English," School Review, XX (1912), 442-457.

²⁰Harold Ordway Rugg, "Teachers Marks and Marking Systems," Educational Administration and Supervision, I (1915), 117-142.

²¹Ralph B. Spence, The Improvement of College Marking Systems, Bureau of Publications, Columbia University, 1927.

²²Edna E. Lampson, "The Problems of Adequate Evaluation of the College Student's Achievement," Educational Administration and Supervision, October, 1940, 493-507.

²³Donald P. Hoyt, "College Grades and Adult Accomplishment," Educational Record, Winter, 1966, 70-75.

²⁴Max S. Marshall, Teaching Without Grades, Oregon State University Press, 1968.

system. The argument for pass/fail had usually been that students should work for knowledge rather than simply for grades.

A combined student-faculty educational policy committee was established, and they stated that the idea of the pass/fail struck at the core of the aims of a liberal education. It allowed and encouraged students to experiment in fields where they would otherwise have had little or no experience.

At Brandeis each student in good standing was allowed four one-semester courses on a pass/fail basis, with the exception of freshmen. No course taken for concentration could be taken on a pass/fail basis, and the pass/fail option did not apply to any courses to fulfill general education requirements.

Sgan concluded from his study that the respondents were overwhelming in support of continuing, if not the present system, a closely allied variation of it. The documentation for this conclusion was obtained from a questionnaire formulated by Sgan. He randomly selected a group of fifty-eight students of which twenty-eight replied. Of the twenty-eight respondents twenty-seven were moderately or strongly in favor of the pass/fail option. He felt that the lessening of the evaluative rigors to which students had become accustomed had been well received by the students and had diminished to some extent the

individual student's worry and the anxiety of the student body as a whole. Sgan said the mere act of grade reform had been positive in terms of the morale of the student body. The pass/fail option encouraged students to move into areas in which they had interest but had not previously recognized as being possible electives.

Sgan concluded that the pass/fail option was a valuable addition to the educational program at selective colleges and universities, but that it should remain a supplementary part of the evaluative system rather than a major part of it.²⁵

Sgan reported a second study at Brandeis University in 1970 that was designed to determine the letter grade achievement in pass/fail courses. The study was limited to sixty students from each undergraduate class at Brandeis who had elected spring term 1968-69 pass/fail courses. Sgan concluded that there was no difference in the letter grades achieved by seniors taking courses on a pass/fail basis, but that a relatively large percentage of freshmen had failed pass/fail courses. Sgan indicated that freshmen had not done as well in pass/fail courses as

²⁵ Mathew R. Sgan, "The First Year of Pass/Fail at Brandeis University: A Report," The Journal of Higher Education, XL (February, 1969), 135.

the seniors because of their inexperience in taking pass/fail courses.²⁶

The American Association of Collegiate Registrars and Admissions Officers conducted a study of grading policies at the 1,696 member institutions in April of 1971. The purposes of the study were to determine (1) the nature and extent of changes from the traditional grading system, (2) practices in accepting transfer students and credits from institutions with non-traditional grading systems, (3) the rate and recency of change in grading systems, and (4) the anticipated nature of grading systems in the near future.

Replies were received from 1,301, or 77 percent, of the member institutions. The study revealed a substantial move among AACRAO member institutions to modify traditional grading policies. The most common was undoubtedly the pass/fail, or credit/no credit, grading policy. It was utilized by 61 percent of the responding institutions on a partial basis and by 2 percent exclusively. The pass/fail option was most popular among large institutions, above 20,000, and among those from the area served by the Western Association of Schools and Colleges. The

²⁶Mathew Sgan, "Letter Grade Achievement in Pass/Fail Courses," The Journal of Higher Education, VIII (November, 1970), 638-645.

pass/fail option was utilized by a majority of the institutions, but a minority of the students were taking pass/fail courses.

The study revealed how member institutions responded to transfer applicants with non-traditional grades. One-fourth to one-third of the institutions indicated they had not yet developed admissions policies to deal with non-traditional grades. Of those with policies, the majority appeared to be quite liberal. Less than 1 percent reported that the applicant with all non-traditional grades would not be considered for admission. Forty percent stated that further evidence of the quality of performance would be requested or the applicant would be considered on the basis of other criteria, such as test scores or the reputation of the sending institution.

A majority of the institutions changes in grading systems had been accomplished in the last one to two years or had been in progress at the time of the AACRAO study. Forty-one percent of the institutions predicted their grading systems would become less traditional and 56 percent expected their current practices to be maintained. Perhaps one of the most significant facts that came out of this survey was that eight out of every ten institutions had

experienced a major change in their grading system within the last six years.²⁷

Stallings, Smock, and Leslie discussed the pass/fail grading policy and some of the important questions that need to be fully researched. They indicated that once a pass/fail option was adopted as institutional policy, good administrative practice dictated an evaluation of the option by admissions and records personnel or institutional research personnel.

The impact of a pass/fail option upon a particular institution has been dependent upon such answers to the following questions: Have the instructors been notified as to which students were enrolled on a pass/fail basis? Was the pass/fail option restricted to certain groups? For example, seniors and graduate students? Have only good students been allowed to elect a pass/fail option? How many hours per semester were allowed on a pass/fail option? Should a fail be considered in computation of grade point average? How has this affected continued scholarships and athletic eligibility?

Other ways of evaluating students had been advocated in an effort to overcome the undesirable affects attributed to the traditional grading system. For instance, many

²⁷E. E. Oliver and others, The AACRAO Survey of Grading Policies in Member Institutions, 1971.

schools had incorporated pass/fail systems in their institutions in an effort to curb the student practice of taking easy, unrelated courses, and to encourage the taking of courses which would broaden intellectual interests.

These were some of the questions Stallings, Smock, and Leslie felt would measure the total impact of pass/fail grading. Did the students in the pass/fail situation achieve at the same level as students who were on the regular grading system? Did students in a pass/fail situation show more favorable attitudes toward the course than on the regular grading system? Did students working in a pass/fail situation attend scheduled class periods as often as those on the regular grading system? Did the students working in a pass/fail situation spend as much time in preparation for class as those on the regular grading system? Did the students in a pass/fail situation audit more courses than those on the regular grading system? What courses were most commonly elected on a pass/fail option? Did the students that elected the pass/fail option differ from others in grade point average, scholastic aptitude scores, or non-intellective characteristics?

It has yet to be demonstrated whether the pass/fail option is only a fad or whether it, in fact, does meet the

objective of encouraging students to elect courses outside their major.²⁸

A typical rationale for a pass/fail policy was that of the University of Illinois:

The purpose of a pass/fail system would be to encourage students to explore areas of interest which they might otherwise feel compelled to pass over because exploration might lead to poor grades.²⁹

The apparent dissatisfaction with traditional grading systems has been widespread. Newsweek reported: "Panic and frustration over grades are becoming so burdensome, many students and educators feel that the cause of learning is being crushed."³⁰

Hechinger has expressed one cause of this dissatisfaction:

Students compete for college admission, for acceptance by graduate schools, and more recently, deferment from the draft. Inevitably, when the percentages are so important, the temptation is to enroll in courses which promise high scores and avoid those which might bring down the all-important average. Carried to extremes, this stands in the way of good education.³¹

²⁸William M. Stallings, H. Richard Smock, and Elwood K. Leslie, "The Pass/Fail Grading Option," School and Society, XCVI (March 16, 1968), 179-180.

²⁹Recommendation from the Urbana-Champaign Senate (University of Illinois), Confirmed by the Board of Trustees, University of Illinois, July 26, 1967.

³⁰"Downgrading the Grade," Newsweek, November 7, 1966, p. 103.

³¹F. M. Hechinger, The New York Times, April 17, 1966, Sec. E, p. 13.

Hoyt reported a study in 1966 dealing with college grades and adult accomplishment. This study attempted to establish a relationship between grades and adult accomplishment. This review was organized primarily around occupational areas. Studies which could not be classified this way were reported under the headings, "Adult Accomplishment in Non-vocational Areas" and "Studies of Eminence."

Studies related to success in business used salary as the criterion of business success. Seven studies were found in this area. Two found positive relationships between college standing and salary at the American Telephone and Telegraph Company. The other studies found no relationship between undergraduate grade point average and salary.

Twelve studies provided specific data on the relationship between college grades and teaching success. The general conclusion was that college grades were not importantly related to success in teaching.

Five studies were found on grades related to success in engineering. The studies in engineering seemed to indicate that academic success did not predict vocational success in this area.

Eight studies were found that related grades to success in medicine. Six of these were completed after 1955 and were unusually sophisticated and thorough. Their

results suggested that (a) there were many separate dimensions to physician performance which varied somewhat with type of practice, (b) undergraduate grades were unrelated to any measure of success or performance, (c) medical school grades were related to measure of over-all success for young physicians, and (d) for experienced physicians no measures of academic performance were related to the quality of professional functioning.

Five studies have been reported since 1961 in the area of scientific research contributions. Consistently, there has been no correlation between undergraduate grade point average and over-all measures of success as a researcher.

There have been isolated studies of the relationship between college grades and success in law, the ministry, journalism, government, and miscellaneous professions. They have found either no relationship between occupational and academic success or, occasionally, very modest relationships. None gave any reason for believing that grades have practical value in forecasting occupational success.

Several studies of eminent men were reported in the early 1900's. They consistently found that top scholars were represented in Who's Who or obtained other distinguished recognition more frequently than was true of graduates with less outstanding academic records.

Only two studies which investigated the relationship between college grades and accomplishment in non-vocational areas were found. No relationship was revealed between grades and measures of civic participation, social activity, and satisfactory home life. However, a significant correlation was found between grade point average and the amount of additional higher education.

Despite the limitations of these studies, we can safely conclude from them that college grades have no more than a very modest correlation with adult success.

This review confronted us with three major implications. First, the meaning of grades needed to be empirically established. Second, evaluation procedures in higher education needed to be drastically altered. Third, these changes needed to be reflected in policies of selection for professional training.

Hoyt's study has given educators a clearer indication of the validity of grades. Grades have been simply measures of general intelligence, they have reflected only superficial knowledge, "testwiseness" and sensitivity to instructors biases have been key determinants of grades, and the knowledge measured is largely transient. Yet, the grade point average has been the only assessment usually made of educational progress. There has been good reason to believe that academic achievement (knowledge) and other types of educational growth and development were relatively

independent of each other. In view of this, the plea has not been to lower standards, but to individualize them more. A student profile has been suggested as a measuring device of student development.³²

To develop this profile we have the work of Davis,³³ and Abe, Holland, Lutz, and Richards.³⁴ Davis found that while faculty members used sixteen different dimensions in describing desirable student characteristics, only three were unsatisfactorily reflected by grades. These were "ethicality," "likeableness," and "altruism." Abe, Holland, Lutz, and Richards, in recent research, has made it clear that check lists of accomplishments can be relatively easily developed to summarize significant indications of personal and professional development.

SUMMARY

In conclusion, the key assumption was that college grades measured only one relatively independent aspect of

³²Donald P. Hoyt, "College Grades and Adult Accomplishment," The Educational Record, XLVII (Winter, 1966), 70-75.

³³J. A. Davis, Faculty Perceptions of Students, IV: Desirability and Perception of Academic Performance (Princeton, N.J.: Educational Testing Service, 1964).

³⁴C. Abe and others, A Description of American College Freshmen (Iowa City, Iowa: American College Testing Program, 1965).

educational development. Many educators felt that another method such as a student profile would measure student abilities and characteristics in a more individualized method and present a broader conception of educational development.

As indicated earlier, much has been written concerning grading systems and the effects these grading systems had on students.

Generally speaking, the literature reviewed indicated that grades did not cause an increase in physical fitness nor was there a relationship between college grades and adult accomplishment. It was further indicated that among many institutions there was a substantial move to modify traditional grading policies and the most popular was undoubtedly the pass/fail, or credit/no credit, grading policy. The literature also revealed that the idea of the pass/fail struck at the core of the aims of a liberal education, and it allowed and encouraged students to experiment in fields where they would otherwise have had little or no experience. The literature further revealed that a great number of individuals were for the continuing of a pass/fail option.

Chapter 3

METHODS AND PROCEDURE

DESCRIPTION OF SAMPLE

The traditional team games and conditioning class was call number 1649 that met from 10:50 a.m. until 11:40 a.m. on Tuesday and Thursday, and the pass/fail class was call number 1643 that met from 12:00 noon until 12:50 p.m. on Monday and Wednesday. The traditional tennis class was call number 1740 that met from 1:40 p.m. until 2:30 p.m. on Tuesday and Thursday, and the pass/fail class was call number 1739 that met from 12:15 p.m. until 1:05 p.m. on Tuesday and Thursday. The traditional circuit training course was call number 1703 that met on Tuesday and Thursday from 9:25 a.m. until 10:15 a.m., and the pass/fail class was call number 1704 that met on Tuesday and Thursday from 10:50 a.m. until 11:40 a.m. These particular courses were selected so that a different teacher would teach each of the classes. In addition, each teacher had two sections of the course they taught.

In order to eliminate as many differences as possible in instruction, paired classes with the same instructor were utilized. In order to assume that the samples were of approximate ability, the following descriptive data were collected:

1. Age
2. Height
3. Weight
4. ACT Composite Score
5. High School Grade Point Average
6. College Grade Point Average
7. Sex

Age of the subjects was recorded in years and months as of September 1, 1972. The height was measured to the nearest one-fourth inch and the weight to the nearest pound as of the first class meeting. The ACT scores and high school grade point average of all subjects except transfer students were obtained from the student's record, and the college grade point average was as of December 21, 1972. December 21, was the end of the Fall Semester.

COLLECTION OF DATA

During the first class meeting those sections involved in the experiment were informed that a research project would be performed, and those involved in the classes designated were informed of the grading system. Students that were members of a particular section at the beginning of the semester but who later withdrew from school or dropped the course were eliminated from the study.

The attendance in all classes was considered as the number of days in which the subject participated in all activities of the class.

The Cumulative Knowledge Test was formulated by the instructor and administered on the scheduled day of final examinations.

The Student/Teacher Evaluation Questionnaire was administered by this investigator on the scheduled day of final examinations.

Team Games

In the team games and conditioning class the Harvard Step Test, as modified by Hodgkins and Skubic; Wear Attitude Test; and the Spielberger, Gorsuch, and Lushene Anxiety Test were administered according to standardized instruction by each author. The Harvard Step Test was developed by Brouha and associates in the Harvard Fatigue Laboratories during World War II.³⁵ The test was constructed for purposes of measuring ability of the body to adapt itself to hard work and to recover from same. Original validity was based upon endurance in treadmill running, maximum heart rate per minute, and blood lactate

³⁵Lucien Brouha, "The Step Test: A Simple Method of Measuring Physical Fitness for Muscular Work in Young Men," Research Quarterly, XIV (March, 1943), 31-36.

level. Further validation of the test was reported by Brouha and Heath³⁶ and Brouha, Fradd, and Savage.³⁷

Skubic and Hodgkins conducted extensive research and consequently modified the Harvard Step Test.³⁸ The subject steps up and down twenty-four times a minute on a bench eighteen inches high. Each time the subject should step all the way up on the bench with the body erect. The stepping exercise continues for exactly three minutes, unless the subject is forced to stop sooner due to exhaustion. In either case, the duration of the exercise in seconds is recorded; the maximum number of seconds is one hundred eighty for the full three-minute period. Immediately after completing the exercise the subject sits on a chair. The pulse rate is felt at the carotid artery and is counted one to one and one half minutes after exercise. Should the subject stop prior to the three minute period the time should be noted and the pulse is

³⁶Lucien Brouha and C. W. Heath, "The Step Test: A Simple Method of Measuring Physical Fitness for Hard Muscular Work in Adult Men," Revue Casabinne DeBiologie, II (1943), 89-92.

³⁷Lucien Brouha, Norman W. Fradd, and Beatrice M. Savage, "Studies in Physical Efficiency of College Students," Research Quarterly, XV (October, 1944), 211-224.

³⁸Jean Hodgkins and Vera Skubic, "Cardiovascular Efficiency Scores for College Women in the United States," Research Quarterly, XXXIV (December, 1963), 454-461.

counted for thirty seconds, starting one minute after cessation of stepping. The following formula was employed in computing the subject's cardiovascular efficiency score:

$$\text{CES} = \frac{\text{Number of seconds completed} \times 100}{\text{Recovery pulse} \times 5.6}$$

The Harvard Step Test as modified by Skubic and Hodgkins was given on the second and twenty-sixth class meetings and was administered by this investigator.

The purpose of the Wear Attitude Test was to determine the attitude of individuals toward physical education courses by utilizing a questionnaire. The Wear Attitude Test consisted of a Form A and a Form B that contained thirty statements each. This test was developed by Carlos Wear in 1951.³⁹ Wear⁴⁰ validated his test in 1955. Broer⁴¹ and Brumback⁴² had also done considerable work with this attitude scale. In this study the Wear Attitude Test

³⁹Carlos L. Wear, "The Evaluation of Attitudes Toward Physical Education as an Activity Course," Research Quarterly, XXII (1959), 114-126.

⁴⁰Carlos L. Wear, "Construction of Equivalent Forms and Attitude Scale," Research Quarterly, XXVI (1955), 113-119.

⁴¹M. R. Broer, "Evaluation of a Basic Skills Curriculum for College Women Students of Low Motor Ability at University of Washington," Research Quarterly, XXVI (1955), 15-27.

⁴²W. B. Brumback and J. A. Cross, "Attitudes Toward Physical Education of Male Students Entering University of Oregon," Research Quarterly, XXXVI (1965), 10-16.

was used to assess any changes in attitude made by the student. The test was given on the second and twenty-sixth class meetings and administered by this investigator.

The Spielberger, Gorsuch, and Lushene Anxiety Test measured how an individual feels right now and how he generally feels.⁴³ It further measured current state anxiety and trait anxiety. This test consisted of forty statements and was given on the second and twenty-sixth class meetings and administered by this investigator.

Tennis

In the tennis class the Dyer Tennis Test, Wear Attitude Test, and Spielberger, Gorsuch, and Lushene Anxiety Test was administered. The Dyer Tennis Test was designed to measure physical achievement in tennis.⁴⁴ It consisted of rallying a tennis ball against a backboard, trying to score as many hits as possible in the time limit of thirty seconds. Accuracy and speed, the two prime requisites of tennis skill, seem to be basic, in about equal degree, to success in the test. The Wear Attitude Test and Spielberger, Gorsuch, and Lushene Anxiety Test

⁴³Charles D. Spielberger, Richard L. Gorsuch, and Robert E. Lushene, STAI Manual (Palo Alto: Consulting Psychologists Press, Inc., 1970).

⁴⁴Joanna Thayer Dyer, "The Backboard Test of Tennis Ability," Research Quarterly (March, 1935), 63-74.

were administered as discussed previously. All three tests were given on the second and twenty-sixth class meetings and administered by this investigator.

Circuit Training

In the circuit training class the Bench Press, Twelve-Minute Run/Walk, Wear Attitude Test, and Spielberger, Gorsuch, and Lushene Anxiety Test were administered. The Bench Press was accepted on face validity with reliability tested through the test/re-test method.

The purpose of the Twelve-Minute Run/Walk Test was to measure the distance an individual can run and walk in twelve minutes. The test was valid, easy to administer, and required little equipment. Cooper⁴⁵ and Doolittle⁴⁶ in their studies have validated the Twelve-Minute Run/Walk Test by comparison with maximum oxygen consumption. The Wear Attitude Test and the Spielberger, Gorsuch, and Lushene Anxiety Test were administered as discussed previously.

The Bench Press Test was administered by this investigator on the second, third, twenty-sixth, and

⁴⁵K. H. Cooper, "A Means of Assessing Maximum Oxygen Intake," Journal of American Medical Association, CCIII (1968), 201-204.

⁴⁶T. L. Doolittle and Rollin Bigbee, "The Twelve-Minute Run/Walk: A Test of Cardio Respiratory Fitness of Adolescent Boys," Research Quarterly, XXXIX (October, 1968), 491-495.

twenty-seventh class meetings. The Twelve-Minute Run/Walk Test was administered by this investigator on the second and twenty-sixth class meetings. The Spielberger, Gorsuch, and Lushene Anxiety Test was administered by this investigator on the third and twenty-seventh class meetings.

Chapter 4

ANALYSIS OF THE DATA

A Groups by Pre/Post fixed A x B factorial analysis of variance with repeated measurements upon one factor was performed upon the data.⁴⁷ Each of the teachers taught a different course. These courses were team games and conditioning, circuit training, and tennis. Each teacher graded one course section by the pass/fail system and one course section by the traditional grading system. The Pearson product-moment correlation coefficient⁴⁸ was run on the relationship of the Harvard Step Test, as modified by Hodgkins and Shubic, with the Wear Attitude and Spielberger, Gorsuch, and Lushene Anxiety tests. The Spearman⁴⁹ rank-order correlation coefficient was also computed on the data. Raw data can be found in Appendix A, and rank order data can be found in Appendix B.

⁴⁷B. J. Winer, Statistical Principles in Experimental Design (New York: McGraw-Hill Book Co., 1962), p. 191.

⁴⁸N. M. Downie and R. W. Heath, Basic Statistical Methods (New York: Harper and Row, 1965), p. 83.

⁴⁹Downie and Heath, p. 206.

TEST RESULTS

Wear Attitude Survey

Analysis of the Wear Attitude Survey for the team games and conditioning class showed that there were no significant group differences. The traditional grading group did not differ significantly in terms of attitude from the pass/fail group. The Pre/Post main effect reflected a significant increase from the first half of the semester to the last half of the semester. Over all, both groups increased in terms of more favorable attitude toward physical education ($F = 15.78$, $df = 1/57$, $p < .01$). This information is shown in Table 1.

Anxiety Self Evaluation Questionnaire

Analysis of the State section of the Anxiety Self Evaluation Questionnaire for the team games and conditioning class showed that there were no significant main effects or interaction, in that the groups did not differ from each other significantly. This information is shown in Table 2. Analysis of the Trait section of the Anxiety Self Evaluation Questionnaire for the team game and conditioning class showed that there were no significant main effects or interaction, in that the groups did not differ from each other significantly in terms of trait anxiety. These data are shown in Table 3.

Table 1
 Analysis of Variance of the Wear Attitude
 Test for the Team Games and
 Conditioning Class

Source	SS	df	MS	F
<u>Between - Ss</u>	17337.59	58		
groups	5.89	1	5.89	.02
error (b)	17331.70	57	304.06	
<u>Within - Ss</u>	6692.00	59		
Pre/Post	1410.71	1	1410.71	15.78**
groups x Pre/Post	188.43	1	188.43	2.11
error (w)	5092.86	57	89.35	
Total	24029.59	117		

** p < .01

Table 2
 Analysis of Variance of the State Anxiety
 Test for the Team Games and
 Conditioning Class

Source	SS	df	MS	F
<u>Between - Ss</u>	9262.29	58		
groups	141.11	1	141.11	.88
error (b)	9121.17	57	160.02	
<u>Within - Ss</u>	4738.99	59		
Pre/Post	54.24	1	54.24	.66
groups x Pre/Post	15.94	1	15.94	.19
error (w)	4668.82	57	81.91	
Total	14001.29	117		

Table 3
 Analysis of Variance of the Trait Anxiety
 Test for the Team Games and
 Conditioning Class

Source	SS	df	MS	F
<u>Between - Ss</u>	8487.78	58		
groups	6.23	1	6.23	.04
error (b)	8481.55	57	148.79	
<u>Within - Ss</u>	3970.99	59		
Pre/Post	1.66	1	1.66	.02
groups x Pre/Post	.06	1	.06	
error (w)	3969.27	57	69.64	
Total	12458.78	117		

Harvard Step Test

Analysis of the Harvard Step Test data for the team games and conditioning class showed that there were no significant main effects or interaction, in that the groups did not differ from each other significantly. This information is presented in Table 4.

Wear Attitude Survey

Analysis of the Wear Attitude Survey for the circuit training class showed that there were no significant group differences. The Pre/Post main effect reflected a significant increase from the first half of the semester to the last half of the semester. Over all, both groups increased in terms of a more favorable attitude toward physical education ($F = 16.35$, $df = 1/26$, $p < .01$). This information is in Table 5.

Anxiety Self Evaluation Questionnaire

Analysis of the State section of the Anxiety Self Evaluation Questionnaire for the circuit training class showed that there were no significant main effects or interaction, in that the groups did not differ from each other significantly. This information is in Table 6. Analysis of the Trait section of the Anxiety Self Evaluation Questionnaire for the circuit training class showed that there were no significant group differences. The Pre/Post main effect reflected a significant decrease in terms of

Table 4
 Analysis of Variance of the Harvard Step
 Test for the Team Games and
 Conditioning Class

Source	SS	df	MS	F
<u>Between - Ss</u>	1537695.20	58		
groups	37468.41	1	37468.41	1.42
error (b)	1500226.80	57	26319.77	
<u>Within - Ss</u>	1108149.00	59		
Pre/Post	5235.56	1	5235.56	.27
groups x Pre/Post	156.50	1	156.50	
error (w)	1102756.90	57	19346.61	
Total	2645844.20	117		

Table 5
 Analysis of Variance of the Wear
 Attitude Test for the Circuit
 Training Class

Source	SS	df	MS	F
<u>Between - Ss</u>	8684.35	27		
groups	131.42	1	131.42	.39
error (b)	8852.92	26	328.95	
<u>Within - Ss</u>	6531.00	28		
Pre/Post	2471.00	1	2471.00	16.35**
groups x Pre/Post	130.99	1	130.99	.86
error (w)	3928.86	26	151.11	
Total	15215.35	55		

** p < .01

Table 6
 Analysis of Variance of the State
 Anxiety Test for the Circuit
 Training Class

Source	SS	df	MS	F
<u>Between - Ss</u>	2336.93	27		
groups	34.97	1	34.97	.39
error (b)	2301.95	26	88.54	
<u>Within - Ss</u>	708.99	28		
Pre/Post	48.29	1	48.29	1.91
groups x Pre/Post	4.43	1	4.43	.17
error (w)	656.28	26	25.24	
Total	3045.93	55		

Trait Anxiety from the first half of the semester to the last half of the semester. Over all, both groups reflected this decrease in anxiety ($F = 6.63$, $df = 1/26$, $p < .05$). Table 7 indicates these results.

Bench Press

Analysis of the Bench Press for the circuit training class indicated that there were no significant group differences. The Pre/Post main effect reflected a significant increase from the first half of the semester to the last half of the semester. Over all, both groups reflected an increase in the amount of weight they could press ($F = 105.95$, $df = 1/26$, $p < .01$). This information can be found in Table 8. The Bench Press Test was accepted on face validity with reliability tested through the test/re-test method. The reliability coefficient for the test/re-test method for the Bench Press Test was .85.

Twelve Minute Run/Walk Test

Analysis of the Twelve Minute Run/Walk Test for the circuit training class showed that there were no significant group differences. The Pre/Post main effect reflected a significant increase from the first half of the semester to the last half of the semester. Over all, both groups reflected an increase in the distance they could walk or run in a twelve minute period ($F = 22.54$, $df = 1/26$, $p < .01$). This information is in Table 9.

Table 7
 Analysis of Variance of the Trait
 Anxiety Test for the Circuit
 Training Class

Source	SS	df	MS	F
<u>Between - Ss</u>	3308.62	27		
groups	153.57	1	153.57	1.27
error (b)	3155.05	26	121.35	
<u>Within - Ss</u>	529.49	28		
Pre/Post	105.88	1	105.88	6.63*
groups x Pre/Post	8.29	1	8.29	.52
error (w)	415.33	26	15.98	
<u>Total</u>	<u>3838.12</u>	<u>55</u>		

* p < .05

Table 8
 Analysis of Variance of the Bench
 Press Test for the Circuit
 Training Class

Source	SS	df	MS	F
<u>Between - Ss</u>	37185.05	27		
groups	.03	1	.03	
error (b)	37185.02	26	1430.19	
<u>Within - Ss</u>	13924.50	28		
Pre/Post	10948.02	1	10948.02	105.95**
groups x Pre/Post	289.82	1	289.82	2.80
error (w)	2686.66	26	103.33	
Total	51109.55	55		

**p < .01

Table 9
 Analysis of Variance of the Twelve Minute
 Run/Walk Test for the Circuit
 Training Class

Source	SS	df	MS	F
<u>Between - Ss</u>	83419632.00	27		
groups	634848.00	1	634848.00	.19
error (b)	82784784.00	26	3184030.10	
<u>Within - Ss</u>	13579900.00	28		
Pre/Post	6215108.00	1	6215108.00	22.54**
groups x Pre/ Post	196244.00	1	196244.00	.71
error (w)	7168548.00	26	275713.38	
Total	96999532.00	55		

** p < .01

Wear Attitude Survey

Analysis of the Wear Attitude Survey for the tennis class showed that the traditional teaching method group displayed a significantly better attitude than did the pass/fail group as evidenced by the significant groups effect ($F = 4.40$, $df = 1/27$, $p < .05$). Also, there was a significant increase from the first half of the semester to the last half of the semester in terms of a more favorable attitude toward physical education as evidenced by the significant Pre/Post main effect ($F = 10.52$, $df = 1/27$, $p < .01$). This information can be found in Table 10.

Anxiety Self Evaluation Questionnaire

Analysis of the State section of the Anxiety Self Evaluation Questionnaire for the tennis class showed that there were no significant main effects or interaction in that the groups did not differ from each other significantly. This information can be found in Table 11.

Analysis of the Trait section of the Anxiety Self Evaluation Questionnaire for the tennis class showed that there were no significant main effects or interaction in that the groups did not differ from each other significantly. This information can be found in Table 12.

Table 10
 Analysis of Variance of the Wear
 Attitude Test for the
 Tennis Class

Source	SS	df	MS	F
<u>Between - Ss</u>	10452.00	28		
groups	1465.68	1	1465.68	4.40*
error (b)	8986.32	27	332.83	
<u>Within - Ss</u>	3660.00	29		
Pre/Post	1026.48	1	1026.48	10.52**
groups x Pre/Post	.18	1	.18	
error (w)	2633.33	27	97.53	
Total	14112.00	57		

*p < .05

**p < .01

Table 11
 Analysis of Variance of the State
 Anxiety Test for the
 Tennis Class

Source	SS	df	MS	F
<u>Between - Ss</u>	18749.52	28		
groups	896.13	1	896.13	1.36
error (b)	17853.39	27	661.24	
<u>Within - Ss</u>	6982.50	29		
Pre/Post	342.78	1	342.78	1.45
groups x Pre/Post	252.69	1	252.69	1.06
error (w)	6387.03	27	236.57	
Total	25732.02	57		

Table 12
 Analysis of Variance of the Trait
 Anxiety Test for the
 Tennis Class

Source	SS	df	MS	F
<u>Between - Ss</u>	4497.38	28		
groups	72.78	1	72.78	.44
error (b)	4424.60	27	163.87	
<u>Within - Ss</u>	2275.99	29		
Pre/Post	232.00	1	232.00	3.14
groups x Pre/Post	50.81	1	50.82	.69
error (w)	1993.18	27	73.82	
Total	6773.38	57		

Dyer Volley Test

Analysis of the Dyer Volley Test for the tennis class showed that there were no significant group differences. The Pre/Post main effect showed a significant increase from the first half of the semester to the last half of the semester. Both groups increased in terms of accuracy of tennis volley capabilities ($F = 38.56$, $df = 1/27$, $p < .01$). This information can be found in Table 13.

INTERCORRELATIONS

Pearson product-moment intercorrelations were performed upon a Pre/Post difference score of the Wear Attitude Survey, Anxiety Self Evaluation Questionnaire, Harvard Step Test, Bench Press Test, Twelve Minute Run/Walk Test, and the Dyer Volley Test as the basic unit score. To alleviate questions concerning the use of ordinal type data only with these calculations, the Spearman rank-order correlation coefficient was also utilized. The above difference scores were intercorrelated with each other as well as intercorrelated with the following additional variables:

Table 13
 Analysis of Variance of the Dyer
 Tennis Test for the
 Tennis Class

Source	SS	df	MS	F
<u>Between - Ss</u>	7138.48	28		
groups	595.80	1	595.80	2.45
error (b)	6542.68	27	242.32	
<u>Within - Ss</u>	3518.50	29		
Pre/Post	2052.16	1	2052.16	38.56**
groups x Pre/Post	29.74	1	29.74	.56
error (w)	1436.60	27	53.21	
<u>Total</u>	10656.98	57		

** p < .01

1. Age
2. Height
3. Weight
4. College Grade Point Average
5. Cumulative Knowledge Test

Analysis of these intercorrelations showed that:

1. There was a significant positive ($r_{xy} = + .41$, $p < .05$) correlation between the height and weight of the subjects tested in the team games and conditioning class. It would be expected that as height increased, weight would also increase. The intercorrelation matrix for the team games and conditioning class is included in Table 14.

2. The correlation between the height and the Wear Attitude Survey for the subjects of the team games and conditioning class was significant ($r_{xy} = + .31$, $p < .05$) and positive. Indications here are that a taller individual has a better attitude toward physical education. Evidently, short, obese individuals do not enjoy physical education, whereas taller individuals do.

3. There was a significant positive ($r_{xy} = + .65$, $p < .05$) correlation between the college grade point average and the Cumulative Knowledge Test for the subjects of the team games and conditioning class. This correlation indicates that an individual with a high college grade point average will also have a high Cumulative Knowledge Test score.

Table 14
 Pearson Product-Moment Intercorrelation Matrix
 for the Team Games and Conditioning Class

	Age	Height	Weight	GPA	Harvard	Wear	Anxiety	Knowledge	State anxiety	Trait anxiety
Age	1.0000	.0049	.2422	-.0191	-.1123	-.0414	.1206	.0751	-.0223	.2558
Height	.0049	1.0000	.4124**	.0405	-.0709	.3076*	.0125	.0993	-.0287	-.0156
Weight	.2422	.4124	1.0000	-.0528	-.1394	.1101	.1394	-.0558	.1420	.0982
GPA	.0191	.0405	-.0528	1.0000	-.0502	-.1922	.1054	.6466***	.0675	.1174
Harvard	-.1123	-.0709	-.1394	-.0502	1.0000	.0120	.0381	-.0827	-.0168	.0862
Wear	-.0414	.3076	.1101	-.1922	.0120	1.0000	-.1746	-.1187	-.2655	-.0393
Anxiety	.1206	.0125	.1394	.1054	.0381	-.1746	1.0000	.2333	.9048***	.8833***
Knowledge	-.0751	-.0993	.0558	-.6466	.0827	.1187	-.2333	1.0000	-.2334	-.1663
State anxiety	-.0223	.0287	.1420	.0675	-.0168	-.2655	.9048	.2334	1.0000	.6004***
Trait anxiety	.2558	-.0156	.0982	.1174	.0862	-.0393	.8833	.1663	.6004	1.0000

*p < .02

**p < .01

***p < .001

4. There was a significant positive correlation ($r_{xy} = + .23, p < .05$) between the Cumulative Knowledge Test results and the total anxiety score of those subjects tested in the team games and conditioning classes. This correlation indicates that as an individual becomes more anxious, he scores higher on the knowledge test.

5. The factor of total anxiety, State and Trait sections combined, correlated significantly and positively ($r_{xy} = + .46, p < .05$) with the height of those subjects tested that attended the circuit training class. This correlation would indicate that the taller an individual is, the more anxiety he displays. The intercorrelation matrix for data collected in circuit training class is presented in Table 15.

6. A significant positive correlation ($r_{xy} = + .45, p < .05$) existed between the height and the State section of the Anxiety Self Evaluation Questionnaire for those subjects tested that were members of the circuit training class.

7. The correlation between the college grade point average and the State section of the Anxiety Self Evaluation Questionnaire for the circuit training class was significant ($r_{xy} = + .37, p < .05$) and positive. This would indicate that as GPA increases, State anxiety also increases.

Table 15
Pearson Product-Moment Intercorrelation Matrix
for the Circuit Training Class

	Age	Height	Weight	GPA	Wear	Anxiety	Knowl- edge	Bench press	Twelve minute	State anxiety	Trait anxiety
Age	1.0000	-.3312	.1900	-.0233	-.2413	-.2413	-.3562	.0388	.1423	-.2150	.1765
Height	-.3312	1.0000	.0764	.0655	.0293	.4595***	.1711	-.0054	-.2178	.4542***	.2733
Weight	.1900	.0764	1.0000	.0762	-.1053	.2768	-.2022	.0770	-.2737	.1329	.3153
GPA	-.0233	.0655	.0762	1.0000	.2438	.2658	-.3020	.0727	.0797	.3760**	.0215
Wear	-.0026	-.0293	-.1053	.2438	1.0000	-.2183	.2553	-.3175	.0688	-.1725	-.1939
Anxiety	-.2413	.4595	.2768	.2658	-.2183	1.0000	-.2005	-.0631	.0345	.8517***	.7746***
Knowledge	-.3562	.1711	-.2022	-.3020	.2553	-.2005	1.0000	-.1582	-.1879	-.1784	-.1378
Bench press	-.0388	.0054	-.0770	-.0727	.3175	.0631	.1582	1.0000	.1466	-.0094	.1250
Twelve minute	.1423	-.2178	-.2737	.0797	.0688	.0345	-.1879	-.1466	1.0000	-.2280	.3493
State anxiety	-.2150	.4542	.1329	.3760	-.1725	.8517	-.1784	.0094	-.2280	1.0000	.3299
Trait anxiety	-.1765	.2733	.3153	.0215	-.1939	.7746	-.1378	-.1250	.3493	.3299	1.0000

*p < .02

**p < .01

***p < .001

8. The factor weight correlated significantly and positively ($r_{xy} = + .53$, $p < .05$) with the factor age for those subjects in the tennis class. This correlation would indicate that as an individual becomes older, he gains more weight. The intercorrelation matrix for the tennis class can be found in Table 16.

9. The Wear Attitude score correlated significantly and positively ($r_{xy} = + .61$, $p < .05$) with the age of the subjects tested in the tennis class. This correlation indicates that a person's attitude toward physical education improves as he becomes older.

10. The correlation between the Cumulative Knowledge Test results and the age of the subjects in the tennis class was significant ($r_{xy} = - .61$, $p < .05$) and negative. This correlation indicates that as an individual's age increases, so does his Cumulative Knowledge Test results.

11. The correlation between the Cumulative Knowledge Test results and the college grade point average for those students in the tennis class was significant ($r_{xy} = + .39$, $p < .05$) and positive. In this correlation there is an indication that Cumulative Knowledge Test results increase as college grade point average increases.

12. There was a significant negative correlation ($r_{xy} = - .40$, $p < .05$) between the Dyer Volley Test results

Table 16
Pearson Product-Moment Intercorrelation Matrix
for the Tennis Class

	Age	Height	Weight	GPA	Wear	Anxiety	Knowledge	Dyer	State anxiety	Trait anxiety
Age	1.0000	.3114	.5279***	-.0730	.6052***	.2611	-.6100***	.0947	.2872	.1292
Height	.3114	1.0000	.7608***	-.0572	.0515	.0285	-.1514	.0856	.0843	-.0649
Weight	.5279	.7608	1.0000	-.2358	.2741	.0078	-.2495	.1465	.0045	-.0120
GPA	-.0730	-.0572	-.2358	1.0000	.0876	-.0353	.3991**	-.0035	.0337	-.0708
Wear	.6052	.0515	.2741	.0876	1.0000	-.1136	-.2200	.2792	-.0691	-.1241
Anxiety	.2611	.0285	.0078	-.0353	-.1136	1.0000	-.2311	-.4000**	.9087***	.9017***
Knowledge	.6100	.1514	.2495	-.3991	.2200	.2311	1.0000	-.0339	.1562	.1937
Dyer	.0947	.0856	.1465	-.0035	.2792	-.4000	.0339	1.0000	-.3125	-.4491**
State anxiety	.2872	.0843	.0045	.0337	-.0691	.9087	-.1562	-.3125	1.0000	.6503**
Trait anxiety	.1292	-.0649	-.0120	-.0708	-.1241	.9017	-.1937	-.4491	.6503	1.0000

*p < .02

**p < .01

***p < .001

and the total anxiety of those students in the tennis class. This correlation would indicate that as anxiety decreases, Dyer Volley Test accuracy increases.

13. The Dyer Volley Test score correlated significantly and negatively ($r_{xy} = - .45, p < .05$) with the Trait section of the Anxiety Self Evaluation Questionnaire for those subjects tested in the tennis class. This indicates that as Trait anxiety decreases, tennis volley accuracy increases.

STUDENT AND TEACHER SURVEYS

A questionnaire was developed to determine the response of those students who were graded on the pass/fail system. Also, an additional questionnaire was developed to determine the responses of the three instructors that participated in the study. A copy of these questionnaires may be found in Appendix C. The following discussion pertains to the student questionnaire.

Question number 1 asked the student his opinion of the pass/fail system at the beginning of the semester. Of the fifty-five total responses 10.4 percent of the students were strongly in favor of the system, 56.4 percent were moderately in favor, 5.5 percent were strongly against, 12.7 percent moderately against, and 14.5 percent of the respondents indicated no opinion.

Question number 2 asked the student to indicate if he would have taken the course had a letter grade been given. Of the sixty-five respondents, 100 percent indicated they would have taken the course if a grade had been given. This response was expected due to physical education being required of all students.

Question number 3 asked the pass/fail students to indicate if they did equal work, more, or less work than students in the traditional grading sections. Of the fifty-five respondents, no one indicated excessively more, 14.5 percent indicated more, 74.5 percent indicated the same, no one indicated excessively less, and 10.9 percent indicated less.

Question number 5 asked the student to indicate his feelings as to how he was evaluated in comparison to a class in which he received a letter grade. Of the fifty-three respondents, 11.3 percent indicated more closely.

Question number 6 asked the student if the pass/fail system allowed the student to work selectively according to his interests. Of the fifty-four students responding, 77.8 percent indicated yes, and 22.2 percent indicated no.

Question number 7 asked the student if he thought the pass/fail system should replace grades entirely. Of

the fifty-four respondents, 22.2 percent answered yes, and 77.8 percent answered no.

Question number 8 asked the student if the pass/fail system should be expanded to de-emphasize competition. Of the fifty-four respondents, 51.9 percent answered yes, and 48.1 percent answered no.

The ninth question asked the student if the pass/fail system should be used for all required courses. Of the fifty-three respondents, 54.7 percent indicated yes, and 45.3 percent indicated no.

The final question asked the student his opinion of the pass/fail system at the end of the semester. Of the fifty-five respondents, 20 percent indicated they were strongly in favor of it, 52.7 percent moderately in favor of it, 7.3 percent were strongly against it, 10.9 percent were moderately against it, and 9.1 percent had no opinion.

As indicated earlier, a teacher evaluation of the pass/fail grading system was administered in the study. A discussion of the responses follows.

Question number 1 asked the instructor to indicate his opinion of the pass/fail grading system at the beginning of the semester. One instructor indicated strong approval of it, one instructor indicated moderate approval of it, and the third instructor indicated moderate disapproval of it.

Question number 2 asked the instructors if it would be more beneficial to them if they did not know which students were taking a course for pass/fail. To this question, one instructor answered yes, and the two remaining answered no.

The third question asked the instructors to indicate if the pass/fail students did more, less, or the same work as their students in their traditional class. One instructor answered less work and the other two indicated the same amount of work.

Question number 4 asked the instructor to indicate if he felt he evaluated the pass/fail students on the same basis as he did his traditional students. Two instructors answered yes to this question, and one answered no.

Question 5 asked the instructor if he felt the pass/fail students learned more, the same, or less than those students in the traditional class. Two of the instructors indicated the same, and one instructor indicated less to this question.

In question number 6 the instructor was asked if he felt the pass/fail system should replace traditional grades entirely. To this question all three instructors answered no.

The seventh question asked the instructor to indicate if he thought the pass/fail grading system should

be used for required courses only. Of the three respondents, one answered yes, and the other two answered no.

In the eighth question the instructor was asked if he thought the pass/fail system should be expanded to de-emphasize competition. To this inquiry one instructor answered yes, and the other two indicated no.

The ninth inquiry asked if the pass/fail system was an adequate attempt to improve the undergraduate curriculum. Two of the respondents answered yes and one answered no.

The tenth question asked the instructor to indicate his opinion of the pass/fail system at the end of the semester. One instructor indicated he was moderately in favor of it, and the other two indicated they were moderately against it.

ATTENDANCE AND KNOWLEDGE TEST

Attendance records were kept for all six classes for every class meeting throughout the entire testing period. In addition, a Cumulative Knowledge Test was given at the conclusion of the semester. By maintaining these records, it was hoped to ascertain whether or not the students attended more, or less, frequently under the pass/fail grading system, and how they performed on the Cumulative Knowledge Test as compared with the students

attending under the traditional grading system. It should be noted here that the subjects' letter grade was not a normalized grade value due to the uniqueness of each teacher. The following is a discussion of these records.

For the pass/fail section of the team games and conditioning class twenty-seven students actually completed the semester. There were twenty-eight possible days to attend. With twenty-seven students and twenty-eight days possible, one has a total possible attendance of 756 days. The students actually attended 743 days for 98.3 percent. On the Cumulative Knowledge Test that was given for this section there were thirteen A's, ten B's, three C's, one D, and no F's. Only one student dropped out during the semester and did not officially withdraw from the university.

For the traditional section of the team games and conditioning class thirty-two students actually completed the semester. There were twenty-nine possible days to attend. With thirty-two students and twenty-nine days possible, a total attendance of 928 days was possible. The students actually attended 899 days for 96.9 percent. For this section only one student dropped out during the semester and did not officially withdraw from the university. On the Cumulative Knowledge Test given there were twenty-three A's, six B's, one C, one D, and one F. There did not appear to be any significant difference

between the attendance, Cumulative Knowledge Test results, and dropout rate between the pass/fail and traditional sections for the team games and conditioning class.

For the pass/fail section of the circuit training class thirteen students actually completed the semester. There were twenty-nine possible days to attend. With thirteen students and twenty-nine possible days, each one has a total possible attendance of 377 days. The students actually attended 327 for 86.7 percent. It is interesting to note that four students started the semester and did not complete the semester. They did not withdraw officially from the university. On the Cumulative Knowledge Test given for this section, there were seven A's, four B's, and one C.

For the traditional section of the circuit training class fifteen students actually completed the semester. There were twenty-nine possible days to attend. With fifteen students and twenty-nine days possible, each one has a total possible attendance of 435. The students actually attended 424 days for 97.5 percent. In this section only one student dropped out during the semester and did not officially withdraw from the university. On the knowledge test given for this section, there were twelve A's, and three B's. It is easy to surmise that for the circuit training class the traditional section attended

much better, made better grades on the Cumulative Knowledge Test, and had fewer dropouts.

For the pass/fail section of the tennis class, thirteen students actually completed the semester. There were twenty-nine possible days to attend. With thirteen people and twenty-nine days possible, one has a total possible attendance of 377 days. The students actually attended 338 days for 89.7 percent. For this particular section, there were no dropouts. On the Cumulative Knowledge Test given for this section there were ten A's and three B's.

For the traditional section of the tennis class sixteen students actually completed the semester. There were twenty-nine possible days to attend. With sixteen students and twenty-nine days possible, one has a total possible attendance of 464 days. The students actually attended 436 days for 93.9 percent. For this section, there were no dropouts. On the Cumulative Knowledge Test given for this section there were fourteen A's and one B. For instructor number three the traditional section attended much better and made better grades on the knowledge test. Neither section experienced any dropouts.

DESCRIPTIVE DATA OF THE SAMPLE

General descriptive characteristics of the sample indicate that, generally speaking, students of the pass/fail section, in comparison with students of the traditional section, were closely matched for any one of the three classes. A chart depicting these descriptive characteristics may be found in Appendix D.

A comparison of the age of the pass/fail and traditional students for the team games and conditioning class indicate that only a few months separate the two groups. A similar comparison of height indicates less than an inch difference. The weight of the two groups varied by only a few pounds.

Similar comparisons of age, height, and weight between the pass/fail and traditional sections for the circuit training class and the tennis class resulted in the same findings as for the team games and conditioning class. Descriptive characteristics did differ more for the tennis class than for the team games and conditioning class and circuit training class. However, there is a logical explanation for this increase in difference. The tennis class had a mixture of males and females, whereas the team games and conditioning class had all females and the circuit training class had all males.

It is interesting to note that all the pass/fail sections had an average ACT composite score of 19.7 as compared to 19.1 for the combined traditional sections. For comparison's sake, Middle Tennessee State University student's average composite ACT score is 19.3 and the National average is 20.0.

Chapter 5

SUMMARY, FINDINGS, AND RECOMMENDATIONS

SUMMARY

Several earlier studies provided evidence that the evolution of grading practices indicated that evaluation began as a non-graded system and gradually developed with the introduction of descriptive objectives, numerical scales, and, finally, letter-grade systems. A further review of earlier studies revealed that in recent years evidence indicated a return to early practices of non-gradedness, thereby completing a cycle. The dichotomous grading systems implicit in the earliest colonial colleges have been paralleled by the contemporary versions of non-gradedness such as pass/fail and other similar approaches.

The preponderance of evidence further indicated that grades did not cause an increase in physical fitness nor a relationship between college grades and adult accomplishment. The studies reviewed indicated that many institutions were modifying their grading policies, but no major changes were being made. The studies further revealed that the pass/fail option was not the panacea to grading problems.

CONCLUSIONS

Several general conclusions seem warranted on the basis of the data gathered from this study. These conclusions are as follows:

1. The major conclusion reached concerning physical fitness was that the commonly accepted assumption, as revealed by Holt, that grades did not increase physical fitness was substantiated. There were no group differences among students of the three instructors when given a skill test. Students in the circuit training class and the tennis class did increase their skills from the first half of the semester to the last half of the semester; however, this increase was realized in both the pass/fail section and the traditional section.

2. The major conclusion reached concerning attitude toward physical education was that no matter what type of grading system was used, attitude toward physical education did increase.

3. The major conclusion reached concerning anxiety during physical education courses was that anxiety levels among groups did not differ. Students in the circuit training class realized a decrease of trait anxiety from the first half of the semester to the last half of the semester, but this was true of the pass/fail students as well as the traditional students.

4. The major conclusion reached concerning competition for grades among students was that one semester on a pass/fail grading system cannot eradicate a proactive twenty-year history of competition for grades. Data collected from Gold, Reilly, Silberman, and Lehr's investigation suggested that to students who had been motivated by grades for years, pass/fail grading may represent only an escape from serious study. These authors further concluded that pass/fail grading might prove more beneficial if instituted earlier in the student's career before grade motivation becomes an obstacle. Some educators have assumed that students did learn more in courses when the effects of competitive grading were reduced or eliminated; however, results of an investigation by Karlins, Kaplan, and Stuart revealed that the pass/fail option was not the panacea that some educators envisioned.

5. The major conclusion concerning the educational value of the pass/fail grading system as well as the traditional grading system was that both should be included as a part of the educational system.

6. The major conclusion reached concerning the attendance of those students in the study was that the students in the traditional sections attended much more regularly than those students in the pass/fail sections. In addition, the frequency of students beginning a semester

and dropping out without officially withdrawing from the university was much greater in the pass/fail sections than in the traditional sections.

RECOMMENDATIONS

Based on the data obtained from this study the following recommendations are made:

1. There is an apparent need for additional research dealing with the pass/fail grading system in courses other than activity courses in physical education. If physical education programs for all students are to be based upon the characteristics and capacities of the learner, such research is necessary to guide program offerings and techniques utilized in presenting these programs.

2. Additional research is needed concerning the pass/fail option in disciplines other than physical education. Consideration should be given to the utilization of the pass/fail option for general education or core requirements.

3. Research is also needed to determine the degree of complexity of admission to graduate school, the granting of financial aid, and the willingness of the business world to hire students partially or exclusively graded on a pass/fail basis.

APPENDICES

APPENDIX A
CODED COMPUTER PRINT-OUT OF RAW DATA
USED IN STUDY

10111212641262350340	-563	-18	10128	0	0	023	6	-5
10211219641362275200	-103	-7	70128	0	0	019	8	-1
10311213671282333300	-92	-8	-160128	0	0	021	-5	-11
10411223631222275180	265	0	50228	0	0	018	3	2
1051121763122225300	54	4	-80128	0	0	020	-3	-5
10611223671492350157	159	-10	20128	0	0	026	6	-4
10711218631222200200	29	14	-40127	0	0	015	-8	4
10811221641072200220	-16	-16	-20228	0	0	015	-1	-1
10911228611432325257	7	-17	-270227	0	0	018	-17	-10
11011228631402125160	298	-10	150327	0	0	014	3	12
11111229621042225178	-221	-9	20428	0	0	012	-2	8
11211213621342400217	-152	-52	-220228	0	0	024	6	-28
11311216681942400325	-64	10	200128	0	0	028	13	7
11411215661262400321	76	-7	-40226	0	0	026	1	-5
11511212661292350292	354	-16	-10127	0	0	018	4	-5
11611218641222300220	342	-24	-350328	0	0	015	-18	-17
11711223661312300284	50	-10	320228	0	0	018	13	19
1181121560 942266260	163	-3	-50228	0	0	014	-3	-2
11911229651272275320	-281	-21	-40128	0	0	024	-8	4
12011223671342250200	-56	0	30127	0	0	021	2	1
12111215641182350320	-90	-2	70128	0	0	020	1	6
12311219691242350320	-125	-18	190127	0	0	019	4	15
12411221671192175192	22	-5	40128	0	0	016	0	4
12511219611422250275	-190	4	-130228	0	0	016	-10	-3
12611230641502250180	-172	-27	20228	0	0	026	2	0
12811213661252250280	590	2	-110325	0	0	025	-18	7
12911212631402275128	8	-15	90226	0	0	023	6	3
20111227671312340305	-75	15	-40129	0	0	028	7	-11
20211218651172400343	-14	-19	40129	0	0	026	3	1
20311218651382350304	-78	-9	110128	0	0	023	-1	12
20411218671352300253	39	36	-820128	0	0	019	-50	-32
20511223661312300371	-106	-5	-10129	0	0	026	-1	0
20611223621282350269	24	-11	210129	0	0	023	20	1
20711214651272300287	-9	-2	40129	0	0	023	5	-1
20811237611102275286	91	3	210127	0	0	018	-9	30
20911216681502225006	-409	18	70427	0	0	0 7	1	6
21111249661302200212	-54	-13	-120127	0	0	019	-10	-2
21211214681462250241	-122	8	50227	0	0	014	-1	6
21311221681742275280	17	-10	-40229	0	0	015	-5	1
21411224661372300362	-64	-10	-130126	0	0	023	-8	-5
2151120961 952225056	148	-5	240327	0	0	016	16	6
21611217621572375362	65	-24	-150129	0	0	017	-10	-5
21711224651282350306	162	-22	290129	0	0	023	19	10
21811223641212300364	-46	-16	130129	0	0	027	3	10
21911227631032300250	0	-22	-250129	0	0	020	-16	-9
22011218661072275253	-8	-7	-30227	0	0	019	-5	2
22111240672202275174	0	4	400226	0	0	020	20	20
22211218641152325250	528	-19	110128	0	0	017	1	11
22311216621052300294	51	-9	-90229	0	0	014	-3	-6
22411215611012350246	-8	-12	70129	0	0	012	-1	8
22511222651072400356	-16	4	160129	0	0	018	13	3
22611216661282200056	104	16	-850523	0	0	0 8	-42	-43
22711222641102375263	-298	-9	-460129	0	0	017	-30	-16
22811220661132250250	-37	-14	-80129	0	0	015	0	-8
22911216661182250287	377	-5	130128	0	0	019	8	5
23011216651182300268	34	7	-20128	0	0	018	1	-3

23111219671142225212	78	9	-20129	0	0	017	2	-4
23211212651082250238	89	-12	80129	0	0	015	9	-1
23311216661352250246	31	-12	20229	0	0	018	-1	3
10212256681411 274	0	3	10129	0	-30	-70	-3	4
10312251701771300258	0	-4	100226	0	-15	-112125	10	0
10412240681631250247	0	-11	40124	0	-20	4620	3	1
10512227701231175223	0	-20	120128	0	-15	-47724	7	5
10712217711531150171	0	-16	40228	0	-20	-144522	4	0
11012249751981400272	0	-8	160224	0	-20	-24223	6	10
11112217711481193307	0	-9	7 18	0	-20	-96014	3	4
11212269681751225269	0	-28	50129	0	-5	-39321	1	4
11312251721401 339	0	5	-10127	0	-30	-724	5	-6
11412204711651200250	0	1	90327	0	-30	-166116	4	5
11512225721821250272	0	-21	00129	0	-10	-127321	-1	1
11612238711861325230	0	-13	-70229	0	-35	-145823	-3	-4
11712233671711375313	0	-9	-30127	0	-50	-53724	-4	1
20112259721991275178	0	-30	110128	0	-25	-175218	10	1
20212254692001200208	0	0	-70129	0	-45	-151819	-2	-5
20312231711881250220	0	-87	150128	0	-68	-86319	7	8
20412235692481400341	0	-3	150129	0	-25	-69428	8	7
20512248661281225208	0	-11	-190223	0	-25	147818	-14	-5
20612263661781150234	0	-25	-40128	0	-40	-107617	-6	2
20812232741461225172	0	-12	-90229	0	-35	-103913	-8	-1
20912223691501 193	0	6	-20229	0	-10	-783	-5	3
21012224711621350305	0	-16	-10129	0	-10	-27224	-2	1
21112236681871250178	0	-22	60129	0	-20	-63912	3	3
21212242711571225280	0	-6	-30128	0	-60	-88417	3	-6
21312251711861225265	0	-5	150129	0	-35	26823	2	13
21512226731691225204	0	-16	250128	0	-25	97826	7	18
21612240712311325240	0	-3	50129	0	-25	-71122	-5	8
21712216731511300381	0	-12	270129	0	-35	-83425	22	5
10113249681562350321	0	-29	170128	-23	0	021	7	10
10213368731801 225	0	-15	150226	-2	0	0	9	-4
10313335621082 331	0	21	00126	-17	0	0	7	-7
10413285661331 360	0	-8	100121	-15	0	0	7	3
10513279651381325206	0	-13	90228	-27	0	016	3	6
10613271711651200257	0	-16	230125	-10	0	017	8	15
10713237731861400248	0	-6	-400129	-1	0	022	-17	-23
10813235671221266220	0	-8	-30224	-9	0	020	0	-3
10913237641452250263	0	-7	-140124	-6	0	018	-3	-11
11013225631302275274	0	0	-210127	-10	0	020	-18	-3
11213222651402300293	0	-6	40128	3	0	016	2	2
11313249741901200213	0	-8	110127	-11	0	014	13	-2
11413219631272250160	0	-16	-140125	-6	0	016	-6	-8
20113444742631 223	0	32	90224	-13	0	0	1	8
20213252701551275205	0	-3	70128	-16	0	020	0	7
20313228641362250225	0	-6	-150128	-16	0	012	-6	-9
20513228661392300344	0	-15	-180127	-14	0	021	-6	-12
20613216671252325312	0	-23	00128	-34	0	015	2	-2
20713288711731 268	0	-12	-290125	0	0	0	4	-33
20813252741801 367	0	-4	70128	-18	0	0	5	2
20913228692171175197	0	-24	80128	-21	0	027	1	7
21013228711751325274	0	-27	120129	-20	0	022	8	4
21113216701621200264	0	-12	-830128	-11	0	022	-46	-37
21213216691302375292	0	-23	-120124	2	0	022	-11	-1
21313228641102225277	0	-2	130128	-16	0	011	8	5

21413216661112275293	0	-12	30128	-20	0	020	3	0
21513276722001 335	0	21	-330127	13	0	0	-12	-21
21613228751551275274	0	-10	20129	-25	0	023	8	-4
21713228641132 300	0	-13	-90127	-2	0	0	-4	-5

APPENDIX B
SPEARMAN RANK-ORDER CORRELATION
COEFFICIENT

Table 17

Spearman Rank-Order Correlation Coefficient
for the Team Games and Conditioning
Class

Source	RHO
Wear Attitude and GPA	- .13
Wear Attitude and Anxiety	.05
Wear Attitude and Harvard	.04

Table 18

Spearman Rank-Order Correlation Coefficient
for the Circuit Training Class

Source	RHO
Wear Attitude and GPA	.34
Wear Attitude and Anxiety	- .13
Wear Attitude and Bench Press	- .12
Wear Attitude and Twelve Minute	- .06

Table 19
Spearman Rank-Order Correlation Coefficient
for the Tennis Class

Source	RHO
Wear Attitude and GPA	.08
Wear Attitude and Anxiety	- .23
Wear Attitude and Dyer	.22

APPENDIX C
STUDENT AND TEACHER EVALUATION
QUESTIONNAIRES

STUDENT EVALUATION OF PASS/FAIL COURSE

Major _____

Call Number _____

Classification _____

This Course Is (Check One)

Required for major _____
Required for university _____
Elective for major _____
Elective _____

Your Grade Point Average

0.0 - 2.5 _____
2.6 - 3.0 _____
3.1 - 3.5 _____
3.6 - 4.0 _____

1. Indicate your opinion of the pass/fail system at the beginning of the semester by circling one of the following:

5	4	3	2	1
Strongly in Favor of	Moderately in Favor of	Strongly Against	Moderately Against	No Opinion

2. Would you have taken the course if letter grades were given?

1	2
Yes	No

3. Do you feel you did the same, more, or less work as students in the traditional grading system?

5	4	3	2	1
Excessively More	More	Same	Excessively Less	Less

4. Was there more or less educational value with the pass/fail system?

1	2
More	Less

5. Indicate your feelings as to how you were evaluated in comparison to a class in which you received a letter grade.

1	2	3
More Closely	Same	Less Closely

6. Does the pass/fail system allow students to work selectively according to their interests?

1	2
Yes	No

7. Should the pass/fail system replace grades entirely?

1	2
Yes	No

8. Should the pass/fail system be expanded to de-emphasize competition?

1	2
Yes	No

9. Should the pass/fail system be used for all required courses?

1	2
Yes	No

10. Indicate your opinion of the system at the end of the semester.

5	4	3	2	1
Strongly in	Moderately	Strongly	Moderately	No
Favor of	in Favor of	Against	Against	Opinion

11. Please use the space below to make any comments, good or bad, you might have concerning your experience with a pass/fail grading system.

TEACHER EVALUATION OF PASS/FAIL COURSE

Call Number _____

1. Indicate your opinion of the pass/fail system at the beginning of the semester.

5	4	3	2	1
Strongly in Favor of	Moderately in Favor of	Strongly Against	Moderately Against	No Opinion

2. If teaching a pass/fail course would it be more beneficial to you if you did not know which students were taking for pass/fail?

1	2
Yes	No

3. Do you feel that the pass/fail students did more, less, or the same amount of work as students in the traditional class?

1	2	3
More	Less	Same

4. Do you feel you evaluated the pass/fail students on the same basis as the traditional students?

1	2
Yes	No

5. Do you feel the pass/fail students learned more, less, or the same amount of course content in comparison with the traditional students?

1	2	3
More	Same	Less

6. Do you feel that the pass/fail system should replace traditional grades entirely?

1	2
Yes	No

7. Do you feel that the pass/fail system should be used for required courses only?

1	2
Yes	No

8. Should the pass/fail system be expanded to de-emphasize competition?

1 2
Yes No

9. Is the pass/fail system an inadequate attempt to improve the undergraduate curriculum?

1 2
Yes No

10. Indicate your opinion of the pass/fail system at the end of the semester.

5 4 3 2 1
Strongly in Moderately Strongly Moderately No
Favor of in Favor of Against Against Opinion

11. Please use the space below to make any comments, good or bad, you might have concerning your experience with a pass/fail grading system.

APPENDIX D
DESCRIPTIVE DATA AVERAGES

Table 20

Descriptive Characteristics of Sample for the
Pass/Fail Sections*

	Age	Height	Weight	H.S. GPA	C. GPA	ACT
Instructor #1	219.4	64.4	129.4	2.86	2.45	19.8
Instructor #2	236.7	70.3	163.2	2.58	2.63	21.2
Instructor #3	262.4	67.2	147.7	2.82	2.59	18.0
Average	234.2	66.5	142.2	2.79	2.53	19.7

*Values reported are averaged values.

Table 21

Descriptive Characteristics of Sample for the
Traditional Sections*

	Age	Height	Weight	H.S. GPA	C. GPA	ACT
Instructor #1	220.9	65.0	126.8	2.95	2.58	18.6
Instructor #2	238.7	70.3	178.7	2.59	2.40	20.1
Instructor #3	248.2	69.1	159.0	2.73	2.78	19.5
Average	232.1	67.3	147.3	2.82	2.59	19.1

*Values reported are averaged values.

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