

A STUDY COMPARING THE LECTURE METHOD
AND TUTORIAL (SLIDE-TAPE)
METHOD OF INSTRUCTION FOR A
HEALTH CLASS UNIT ON
PHYSICAL FITNESS

By

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CHAPTER I

INTRODUCTION

Innovation in education is directed toward qualitative and quantitative improvement of the learning process. Learning theorists are still baffled as to which learning process is the best; however, each theorist supports the need for efficiency. Educational efficiency is a ratio of the time consumed (student and teacher) to the time taken to development or alteration of behavior of the learner. Accountability is the magic word of the seventies for this needed efficiency in education. The so-called innovative learning techniques used today are only extensions of the instructional theory derived from what we have known as "theories of learning". With the mass communication techniques more plentiful than ever before, the need to connect theory with machine is at a new peak. This study is based on the concept of matching learning theory with innovative technique for the purpose of determining which treatment processes will best provide efficiency in education for the student and teacher.

Knowing and learning have long been recognized as a basic need of man, and the process by which human beings learn has been a major concern of educators for years;

however, the learning process is still not discretely defined by scientific observers. Although there seems to be no universal accepted definition for learning, most proposed definitions attempt to recognize learning as something that occurs within the individual student and, as a result, the learner's behavior changes (16).

An analysis of human learning reveals that the human being is capable of several different types of learning. He may exhibit behavior which indicates that motor learning has occurred, or rote learning, or comprehension, or problem-solving. The learning process may or may not be of the same nature for each category, but the changes of behavior that are produced are totally distinct for each category (16).

In the cognitive category alone, there is a wide range of learning methods. Methods involving visual, verbal, and auditory literacy are presently being expanded to help integrate the categories of learning. Different types of learning require different channels of communication. Learners place varying degrees of emphasis on the literacy methods. For example, a person with a reading problem may receive a small portion of his communication from the verbal literacy method, yet depend heavily on the visual or auditory methods for communication.

Thus far consideration has been given to only the cognitive domain of learning. What areas of learning are involved in the affective domain? Beliefs, attitudes, values, and personality characteristics are a positive part

of learning that represent the affective domain. Special emphasis should be placed upon the relationship between the cognitive and affective objectives of learning. There is a dependent relationship between the cognitive and affective domains in the making of the whole human being.

According to Oxendine (12), there are at least four elements that are necessary if learning is to take place:

- (1) A living motivated organism:- learning will not occur without motivation. The individual acts to satisfy a need and participates in an act which will reduce his need or feelings for it. The motivation may be intrinsic or extrinsic but still represents a driving force for the learner.
- (2) An incentive which will lead to satisfaction of motives:- incentives are hard to separate from motivation and share the common base of feelings as a moving force on an individual.
- (3) A barrier or block, which prevents the organism from immediately gaining the incentive:- learning occurs only when there is a problem frustrating the learner. Regardless of the nature of the learning, the learner is kept from a goal. The learner trapped in this situation will appraise the problem and select a method of attack.
- (4) Effort or activity on the part of the organism to attain the incentive:- after selecting a method of attack, the learner is responsible for personal action to accomplish the goal. It must produce effort or activity that involves the learner if learning is to take place. There seems to be no

uniformity in the speed or ease with which different individuals progress through the different phases of the learning process.

If the tutorial (slide-tape) system of instruction could be used with success, it might offer the learner (1) convenience, (2) motivation, (3) selection of learning experiences. Convenience would be expressed by having the equipment (tapes-slides and projector) available for use at times desired by the student. Motivation could arise from needs and interests of the student in pursuit of new material. Selection of the learning material could range from programs developed to cover the elementary to the more complex units. According to Woodruff (12), the speed of learning depends upon (1) the capacity of the individual, (2) the degree of motivation, and (3) the nature of the task. The tutorial system--taking advantage of convenience, motivation, and selection--could possibly speed up the learning process.

Even though multi-media instructional programs are becoming commonplace for students of the seventies, and even though the use of slides in the classroom is not uncommon, it has been difficult to find commercially-prepared slides which can be integrated easily into a lesson plan and which are relevant to the teacher's or student's immediate experience. Now, however, with the relatively inexpensive and easily used instamatic cameras, it is possible for

anyone to line up his desired picture or slide, press the button, and have his film developed.

In addition to the ease of taking slides, there are decided classroom benefits. The teacher has the opportunity to raise questions for an investigation, create a dramatic atmosphere, and simultaneously create enthusiasm by showing a picture. The enjoyment of sharing an experience of interest is enhanced, especially if local sites or people can be used to offer inquiry to the situation (3).

There are a number of ways in which materials could be applied to the classroom situation. Students may be assigned to use a specific material as a required part of a course, or students may be advised of certain material that may be available for remedial or optional work. Instructor's material used in class may be obtained by students if class work was missed or for review purposes. Material may be utilized on strictly a demand basis for general education breadth (7).

Many instructional media specialists believe that the sound/slide lessons are becoming the major informational medium in use today. This system seems to be the most practical method for presenting self-pacing instructional material at a low cost (3)

Since this study involves comparing the lecture method of instruction with the tutorial (i.e., slide-tape) method of instruction, a machine was needed to apply the slide concept with a synchronized sound tract. The decision was made

to investigate the potential of the Singer Caramate Rear Screen Projector. A few of the factors that influenced the decision were: (1) price, (2) mobility of the unit, (3) ease of programming, (4) fixed rear projection screen, (5) flexibility in time duration of the tape, (6) use of Kodak Carousel slide trays, (7) a good service record at Oklahoma State University Audio-visual Center, and (8) ease of loading and unloading the tape and slides.

There are some doubts that a sound/slide system has its place in the educational environment. What are its potentials? Are the costs justifiable for the service provided? Will the students identify with a machine? Can it be programmed by classroom teachers? Is it capable of providing instruction equal to or greater than the classroom teacher on a given topic or unit? The concern of this research is to resolve these questions.

It is hoped that through this study, the "verbal" and "visual" aspects of learning may be incorporated by the use of the slide-tape system to provide cognitive learning situations for the learner.

Statement of the Problem

The purpose of this investigation was to determine if there was any statistically significant difference on post-test scores between two randomly assigned groups of students after attending either the lecture method of instruction or

the tutorial (slide-tape) method of instruction on a unit of study on physical fitness.

Null Hypotheses to be Tested

Hypothesis I: There will be no statistically significant difference between the experimental group and the control group for all sections combined when their post-test scores are compared.

Hypothesis II: There will be no statistically significant difference between the 8:30 a.m. experimental group and the 8:30 a.m. control group when their post-test scores are compared.

Hypothesis III: There will be no statistically significant difference between the 10:30 a.m. experimental group and the 10:30 a.m. control group when their post-test scores are compared.

Hypothesis IV: There will be no statistically significant difference between the 1:30 p.m. experimental group and the 1:30 p.m. control group when their post-test scores are compared.

Significance of the Study

This investigation provides experimental data regarding the potential of the slide-tape method of instruction as a replacement for the lecture type instruction of Oklahoma State University students in the health unit of physical fitness. Data gathered from this study could give rise to

the establishment of a tutorial laboratory in the area of Health, Physical Education, and Recreation.

The general population of university educators could benefit from this information. The results of this study might suggest an added dimension of slide-tape instruction as an educational tool to aid students at all levels of competency. The advanced students could be challenged with accelerated materials while the basic units could be programmed for the beginning student.

The flexible time schedule of the tutorial system may offer a desirable alternative to the student and the instructor. Reduction of class size for specific units of study may be accomplished by a split (tutorial and lecture) class during units to be studied.

Limitations of the Study

This investigation was limited in the following ways:

(1) No attempt was made to change the regular enrollment patterns of the Personal, School, and Community Health course. The lecture times, meeting place, days of the week, and class meetings and the size of the classes were not altered for the study.

(2) No attempt was made to control interest and motivation of the students. The course is a curriculum requirement for some students and not for others.

(3) The acceptance of the instructor by the students was not controlled in this study.

(4) No attempt was made to determine to what extent the experimental group "accepted" the tutorial system.

Delimitations of the Study

The study was restricted in the following ways:

(1) The subjects of the experimental and control groups were randomly selected from the official roster of the 8:30 a.m., 10:30 a.m., and 1:30 p.m. Personal, School, and Community Health course (HPER 2423) offered in the spring semester, 1974, at Oklahoma State University.

(2) Projectors were located in the Non-Book Room of the Oklahoma State University Library. This room is located in the southeast corner of the first floor. Six projectors were used with four sets of twelve lectures available for check-out. The Non-Book Room is open for student use eighty-six hours per week.

(3) The slides and tapes for the physical fitness unit were produced and directed by the investigator.

(4) The length of the treatment was twelve lectures plus one day of orientation and two days for pre-test and post-test. The treatment ran from January 14, 1974, through February 18, 1974. The complete treatment was covered in the first five weeks of the spring semester.

(5) A textbook was not used in conjunction with the physical fitness unit; however, there is a textbook required for the course.

(6) The lecture notes used to produce the tapes for

the experimental group were used for "live" lectures delivered to the control group. The slides used on the Caramate Projector were used on the Kodak Carousel slide projector in the classroom. The length of the lectures for both groups was approximately the same.

(7) Attendance for both the experimental and control groups was required.

(8) The students' grade for the unit was based on their score on the post-test.

(9) Students of more than 25 years of age or less than 18 years of age were removed from the sample when the data were analyzed.

(10) No attempt was made to determine whether students of either group were aware that they were subject of an experiment.

Definition of Terms

(1) Physical Fitness:

The ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies. Thus, physical fitness is the ability to last, to bear up, to withstand stress, and to preserve under difficult circumstances where an unfit person would quit (H. Harrison Clarke).

(2) Experimental Group: A randomly selected group of students from the Personal, School, and Community Health course who attended lectures at the Oklahoma State University Library Non-Book Room using the Caramate Projector.

(3) Control Group: A randomly selected group of students from the Personal, School, and Community Health class who attended lectures in room 105 of Colvin Physical Education Center. This group was offered live lectures with the same slides used as a mode of instruction for the experimental group.

(4) Singer: The manufacturer of the Singer Caramate Rear Screen Projector system used in this research. The Educational Division of Singer Educational Systems is located at 3750 Monroe Avenue, Rochester, New York 14603.

(5) Caramate: The brand name or trade name given to the Singer Rear Screen Projector.

(6) Tutorial System: A system of instruction using a machine and usually associated with an independent time schedule for the learner.

(7) Slide-Tape System: The combination of visual and audio synchronized system of presentation.

(8) Pre-test: A written one-hundred question multiple choice examination given to all students participating in the research. The examination was given January 16, 1974.

(9) Post-test: This examination was the same as the one used as a pre-test. The score made on this exam determined the student's grade for the physical fitness unit. The examination was given February 18, 1974.

(10) Carrel: A booth provided in the Non-Book Room in the Oklahoma State University Library for the students of the experimental group to use the Caramate Projector. Head

sets were provided to hear the audio portion of the taped lecture material.

(11) Tape: Ampex 90 tensilized polyester tape used for recording of the lectures to be played on the Caramate). A reliable cassette construction case covers the tape. The tapes will play 45 minutes per side.

(12) Slides: A mounted transparency, either film or glass, intended for projection or viewing by transmitted light, usually 2 x 2 paper board frames containing 35mm film sections to be carried and supported by a carousel slide tray and used on the Caramate Projector.

(13) Non-Book Room: A room in the southeast corner of the first floor of the Oklahoma State University Library containing non-book media equipment and references.

(14) Rear Screen Projection: The projection of an image from the back of a translucent screen for viewing. It allows the viewer to see the image in a well-lighted room.

(15) Course: One of three sections of Personal, School, and Community Health class, of the spring semester, 1974.

Sections: 8:30 a.m., 10:30 a.m., and 1:30 p.m.

(16) Lecture Group: The Control Group.

(17) Tutorial Group: The Experimental Group.

CHAPTER II

REVIEW OF LITERATURE

Slide-tape systems offer special advantages as an inexpensive alternative to film or television, whenever the "movement" element of the picture is not essential. It is often the medium of choice for recording entire illustrated lectures, and it is rapidly becoming an audiovisual medium in its own right with its own characteristics, opportunities, and limitations. Slides have the highest rating in picture quality and are capable of carrying very fine detail. Slides lend themselves well to adaption to the needs of student-paced self-teaching machines (9).

Although the cost of audiovisual equipment and material should not be the sole criterion in determining media policy, it may be a limiting factor. In this respect, the new medium of synchronized sound-slide rates higher than its older and technologically more complicated rivals, film and television. At the time this study was done, a one-hour lecture could be audio-recorded, and a hundred existing color slides can be copied for a total cost in materials and laboratory charges of less than twenty dollars. If original slides have to be made for this purpose, the cost of materials will be somewhat higher; and if other costs are involved,

such as graphic materials, these will have to be added to the cost of the designer's time. But the cost in materials and laboratory charges will still be extremely low compared with any form of motion picture (9).

In a study of the effectiveness of three media modes (i.e., still pictures, slides, and motion pictures), Wells (19), using 594 students randomly selected from an Introduction to Botany course taught in a large midwestern university, had the students view biological phenomena involving the concepts of time, space, and motion by a different presentation mode. The three concepts were studied at different stages of the semester. Objective questions and attitude scales were administered immediately upon the students' completion of the experimental study material. Wells found that slides were more effective than sequential still photographs, but there was no significant difference between the effectiveness of motion pictures and slides. One possible explanation may be that, in the case of sequential still photographs, the subject was required to move his eyes across the page constantly changing his reference point. When viewing slides, the subject focused his eyes on one point while the slides changed, which made the change of position of the object more apparent in each succeeding slide.

Certain visual media modes are more effective than others in presenting concepts involving time, motion, and space. Of the three visual media modes used, motion

pictures were more effective for presenting concepts involving motion; and sequential still photographs and slides appeared more effective than motion pictures in presenting concepts involving space (19).

The question of whether or not the teacher's attitude toward educational media is reflected in the student's learning was studied by Hartley. The aim of Hartley's research was primarily to determine if he could construct a valid and reliable questionnaire that will measure teachers' attitudes toward the new media. A questionnaire was developed, using (the orthodox) Likert scaling procedures, submitting a large number of items to standardization groups to produce eventually a short scale containing items known to discriminate between teachers who were favorable and teachers who were hostile to new educational media. Hartley's experiments were limited in that the numbers involved were extremely small; however, he concluded that if there is a teacher in the system, he or she will--probably quite unintentionally--influence the results obtained. Sometimes this influence may not be apparent to an observer, but on other occasions it may be obvious. Teacher attitudes have an important part to play in programmed learning (4).

Rear screen projection is ideally suited to lecture room and classroom instructional presentation with slides. The instructor can lecture with light beams behind him without casting a shadow. Room lighting can vary from low to high, as long as it is not aimed directly at the screen,

allowing any kind of class activity (17).

At the present time, sharp differences of opinion exist concerning the possible and probable consequences of giving students a test before the commencement of instruction. There is evidence that pre-tests can have orienting and motivational and (hence) teaching functions, in addition to the sought for testing function. Warr (18) carried out an experiment with foremen in a weekend course who were studying accident prevention. The men ($N = 43$) were divided into three groups. Group I took half the post-test as a pre-test before instruction. Group II took the other half of the post-test as a pre-test. Group III did not take a pre-test. The results were: performance was best on questions previously seen; performance was next best on those questions not seen by the pre-test groups; performance of Group III was poorest. Therefore, as Warr et al. said, pre-tests can have a teaching as well as a testing function.

The effects of pre-testing on post-testing performance were studied by Hartley. He compared six experimental studies done by colleagues and reached the following conclusions: if the instruction is efficient (i.e., if all students learn to criterion), the effects of administering a pre-test on post-test performance are unlikely to manifest themselves. However, if the students involved are different (e.g., older), and if the learning is less efficient, it may be profitable first of all to administer a pre-test. The findings suggest that in such situations not only does a

pre-test alert one's expectations to what is required, but it seems to assist in the organization of other related material in order that it can be easily remembered.

There has been considerable research interest in the advantages and limitations of programmed learning in pairs. It has been argued, for instance, that compared with individual programmed learning, programmed learning in pairs has the advantages of (1) greater economy, (2) less boredom for pupils, (3) interaction leading to better learning, and (4) increased retention. Advantage (1) can apply only if pupils share the same program and equipment. Experimental support for advantages (2) and (3) is limited, and the evidence for advantage (4) is almost nonexistent. The evidence available does suggest, however, that programmed learning in pairs is a viable proposition: pupils learning in pairs usually do no worse than pupils learning as individuals, and sometimes they do better.

If this is accepted, then the next question becomes whether some methods of pairing lead to better results than do others. There appear to have been two main approaches to this problem. Investigators have either paired students on the basis of ability or prior knowledge of the task in hand (or both), or they have paired pupils on the basis of some personality measure (e.g., extroversion-introversion). Both of these approaches, however, have had the same aim--to see if one method of pairing leads to better results than another.

In an experiment undertaken by James Hartley and F. W. Hogarth (a student of Hartley's), they studied 80 grammar school boys who used a programmed textbook in chemistry written for paired work. Each class was divided into two groups according to ability, based on their previous end-of-term examination scores and their 11+ (age) I.Q. scores. The pupils were then paired, high-ability with high-ability, low-ability with low-ability, and high-ability with low-ability, to work through the program. The results were very clear. There was no significant difference between the performance of low-ability pupils working with high-ability ones and low-ability pupils working together. Similarly, there was no significant difference between the performance of high-ability pupils working with low-ability ones and high-ability ones working together. These results were replicated on a retention test given three weeks later.

There was evidence that although overall the pupils expressed a liking for working in pairs, the high-ability members of the mixed-ability pairs did not like the situation as well as the other pupils did.

Hartley concludes that it is of little value to pair students for programmed instruction. Regardless of the pairings that are attempted (e.g., boys and girls, boys and boys, girls and girls, friends or foe), the value is the same. The theories of learning from pairings for programmed instruction indicate no significant differences. The result of pairing methods are marginal if one is looking for a

simple way to improve learning. Considering these results in another way, however, they do suggest that teachers do not need to bother spending time devising sophisticated methods of pairing pupils (4).

For some time now tape recording equipment has been used in many phases of education. Much of the use of this equipment in the learning process has been supplementary in nature. A well-known example is the use of tapes in language courses. Research on the use of tapes in language courses has shown there is still some question regarding the effectiveness of the language laboratories.

Very few studies, however, have attempted to assess the effectiveness of direct teaching by tape recorded lecture. In 1962, Popham (13) used tape lectures in both graduate and undergraduate courses. In both of these studies the students listened to the same tape recorder at the same time and in the same room, much as in a normal class meeting. Following each recorded lecture the students engaged in discussion groups. Popham found no significant differences in achievement between these students and control groups who received the traditional live lecture presentation.

The course used in Menne's study was an Introductory Psychology course at Iowa State University, a course which is taught every quarter. During the winter and spring quarters of 1967, the lectures were recorded and notes were taken on the blackboard material used by the instructor during the presentation of his lectures. Later the tapes were

edited, cutting out purely topical references, and the blackboard notes were assembled into booklet form. The instructor whose lectures were recorded was also the lecturer for both replications of this experiment, and he made no basic changes in the presentation of his material. Thus, what the experimental subjects heard on tape was almost exactly what they would have heard had they attended live lectures.

The experiment was conducted during the fall quarter of 1967 and replicated in the spring quarter of 1968. No methodological changes were made between replications of the experiment. It was hypothesized that there would be no significant statistical differences in achievement between the students who attended the lectures and those who used the tapes exclusively.

The students who signed up for the section could choose between taking the course by traditional lecture or by taped lecture. In the fall, 149 chose tape (experimental group), 211 chose live lecture (control group); in the spring, 141 chose tape and 197 chose the traditional lecture method. Each experimental subject was issued a tape recorder, a complete set of lecture tapes, a booklet containing the usual blackboard material, and a schedule of the lecture topics to be given to the control group.

The experimental subjects agreed (1) not to attend the live lectures, (2) not allow control subjects to listen to the tapes, and (3) not to copy the tapes issued to them.

Each experimental subject was left entirely free to proceed at his own pace. He was, however, allowed to attend class sessions when supplementary movies were shown, and he was required to take the three exams given over the course material. All exams were of the objective, multiple-choice type. Thus, no distinction between control and experimental subjects could be made in grading.

In all cases the difference was insignificant, with the exception of the second exam in the spring quarter where the experimental group had a mean score of 32 out of 45 as compared with 30 for the control group. This difference was statistically significant at the .05 level.

This study confirms and extends Popham's previous findings that taped lectures can be as effective as the traditional lecture presentation in supplying information to college undergraduates. It was predicted that students, given a recorder and a set of tapes, could and would learn as much about the course material as would the students who attended the regular lectures; and this, in fact, is what the results of the experiment indicated.

Benjamin Richason, Jr. (14), of Carroll College, Waukesha, Wisconsin, has devised an audiovisual tutorial system for teaching geography with the principal structural component of the system being a series of 15 carrels, each equipped with a 35 mm slide projector and audiotape transport. The program has been analyzed for a period of 12 semesters, and the analysis of data reveals that 40 per cent

more content material is presented in the AVT (Audiovisual-Tutorial) course than was formerly taught in the conventional classroom. The students have spent an average of 3 hours and 32 minutes per week in the independent study portion of the course, and scores on examinations have increased by 28.75 per cent over a four-year period in the AVT course. This development of a high involvement teaching procedure has resulted in a learning experience which has produced positive attitude responses from students. More than 48 per cent have indicated that the AVT course was either the best course they had taken in college, or that it was among the three best courses taken. Almost 80 per cent of those enrolled in the AVT course felt that this method of instruction was superior to the traditional expository approach; and, almost 90 per cent indicated that the discussion on the tapes was well-organized and well-presented, that the color slides and extra visuals aided their interpretation of the facts and concepts, that the discussion and involvement exercises were well-integrated, and that the course had stimulated their interest in the world around them. Almost two-thirds of the students felt there was no loss of personal contact with the instructor, and more than 92 per cent felt that the course elicited a type of student enthusiasm not present in a traditionally presented course.

Furthermore, audiovisual-tutorial instruction is quantitative, and thus has made possible the evaluation of many

affective objectives, as well as instructional procedures and materials. Because of the availability of such outputs, the teaching strategies, media materials, and effective responses can be constantly monitored according to Richason (14).

In the opinion of A. A. Lumsdaine (2), "Auto-instructional methods may represent the most important innovation in education since the advent of the textbook." One reason for this opinion is the fact that the development of programmed self-instructional material is closely tied to the use of empirical data obtained from students' responses as a basis for program revision. The development of teaching machines and programs for self-instruction requiring the participation of the student has proceeded rapidly during the past few years. Many proponents of teaching machines believe that the auto-instructional concept and its implementation are likely to have a very important implications for the conduct of instruction, and may even revolutionize education. Basically, teaching machines present sequences of programmed instruction to the student, requiring his active response at frequent intervals or, in many instances, almost continuously, and providing him with prompt feedback in the form of correction or confirmation for each response. By allowing individuals to advance at their own rate through a program of materials, these devices permit students to proceed as rapidly as their abilities permit.

To conclude this review of literature, it seems

appropriate to make reference to a personal letter (see Appendix) from Mr. Marvin I. Mindell (11), Vice President Engineering, for the Singer Education Division and Education Systems. The letter refers to the pressing need for literature and research in the area of slide-tape systems. The letter states that the slide tape projectors are a success in the market place; but little, if any, has been recorded as to its effectiveness or efficiency as a learning machine. The letter supports the conviction of the need for research with slide-tape systems. The production of equipment utilizing the slide-tape concept has far overshadowed the educational research at this point in time.

CHAPTER III

PROCEDURES

This chapter describes briefly the procedures that were utilized during the investigation.

The Subjects

The subjects for this study were students enrolled in the course, Health, Physical Education, and Recreation 2423, Personal, School, and Community Health, at Oklahoma State University for the spring semester of 1974. The students were not told that an experiment was being conducted during the semester. The class was sectioned into three time intervals. The first section was scheduled for Monday, Wednesday, and Friday at 8:30 a.m. The second section was scheduled for Monday, Wednesday, and Friday at 10:30 a.m. The third section was scheduled Monday, Wednesday, and Friday at 1:30 p.m. The classroom was listed as Colvin Physical Education Center 105.

The subjects were randomly assigned to either the control group or the experimental group by the use of a random-unit table. Numbers were assigned (i.e., 1-N) to each of the class roll sheets as they were printed by the office of

the registrar. One-half of the total number of students was drawn for the experimental group leaving one-half of the students for the control group.

The Control and Experimental Groups

The control group remained in room 105 of the Colvin Physical Education Center for their lecture. An identical set of slides was used by the instructor for the live lectures as were used for the tutorial slide presentation. The lecture notes used in live lectures were used to produce the tape recordings for the tutorial lectures. The control subjects attended class as scheduled during regular enrollment. Questions that arose during the live lecture period were answered by the instructor at that time. Office hours were posted by the instructor for the students' convenience.

The experimental group was given information concerning the Non-Book Room of the Oklahoma State University Library, and instructions were typed and Mimeographed for each student as a part of the regular class study guide (see Appendix). (This information was not provided in the study guide for the control group.) A listing of the time schedule for the Non-Book Room was also included. The professor held regular office hours in the Non-Book Room for the experimental group (Tuesday and Thursday, 9:00 a.m. to 11:00 a.m.). These office hours were in addition to the office hours scheduled in the Colvin Physical Education

Center, Monday, Wednesday, and Friday, 9:30 a.m. to 10:30 a.m., 2:30 p.m. to 3:30 p.m.

The Pre-Test Examination

A pre-test was given to both the experimental and control groups. The pre-test was a one-hundred question, multiple-choice examination on the concepts of physical fitness to test the subjects' general knowledge of physical fitness before starting the unit. For the pre-test, eight questions selected from ten of the twelve concepts to be covered during the unit and ten questions selected from each of the remaining two concepts. The pre-test was given in room 105 of the Colvin Physical Education Center during the second class period, January 16, 1974. The pre-test was given during the regularly scheduled meeting time of the classes (i.e., 8:30 a.m., 10:30 a.m., and 1:30 p.m.). The test was not returned or discussed with the students following the pre-test.

The Post-Test Examination

The one-hundred question general knowledge examination that was given as a pre-test was given as a post-test examination. The student's score made on the post-test examination determined the grade for the student for the unit. The post-test examination was given February 18, 1974, during the regularly scheduled meeting time of the

classes (i.e., 8:30 a.m., 10:30 a.m., and 1:30 p.m.)

The Caramate Projector

The Caramate combines the convenience and mobility of rear screen projection with the desirability of slides. Record capacity makes it easy to personalize the approach while individual programming simplifies and enhances the communications goal. Caramate is a lightweight, trimly compact projector that magnifies 2" x 2" slides 6½ times, projecting them brightly and sharply on a big nine-inch screen.

The synchronized cassette sound provides the same commentary on the sound and slide system lectures as the classroom presentation. A summary of the Caramate electrical and mechanical specifications may be found in Appendix B.

Slide Selection

The slide selection for the unit was taken by the professor. The material presented in the twelve lectures was based primarily on the textbook, Concepts in Physical Education by Corbin, Dowell, Lindsey, and Tolson, and published by Wm. C. Brown Publishers, 1970.

Written permission was received from W. C. Brown Publishing Company (Appendix) to photograph materials from the Concepts in Physical Education Workbook.

A total of 1629 slides was used in the study; this represents four sets of twelve lectures (405 slides per set)

were used for instruction during the units. The range of the number of slides for the twelve lectures was 26 to 52 slides per lecture. A mean number of slides used each lecture was 34 slides.

The slides were taken with a Mamiya Sekor 1000 DTC F1.8 camera. A micro-lens and a copy stand were used to photograph close-up information.

Tape Selection

The tapes were composed and narrated by the investigator/professor. The lectures were recorded in advance and synchronized with the slides for use on the Caramate Projector. The tapes used on the Caramate Projector contained the same information given in the control group lecture.

Lecture notes were recorded in advance of the study on Ampex 350 recording cassette tapes of C-90 length. The taped portions of the units ranged from 25-40 minutes with a mean of approximately 30 minutes. Four copies of each lecture were reproduced from the master copy and placed in the Non-Book Room of the Oklahoma State University Library with the four copies of the slides for students use during the unit.

Attendance at Lectures

Control Group

Attendance for HPER 2423, Personal, School, and Community Health, was required. Students were informed of

attendance policies. A student missing more than four lectures of this unit was dropped from the study; however, the student continued to be a member of the regular class.

Attendance at Tutorial Center

Experimental Group

Students assigned to the tutorial center or experimental group were informed of attendance policies. Roll was taken by the Non-Book Room clerk in the Library. Each time a unit was checked out to a student, the check-out was recorded in a roll book by the clerk. The number of the lecture and the time it was checked out and checked back in were recorded.

Three lectures for the week were placed for check-out Monday morning at 8:00 a.m. Each Monday thereafter, a new series of three lectures for the coming week were placed for check-out. This gave each student 86 hours in which to select three hours of class time.

A student could check out one lecture at a time, but he could check out the same lecture as many times as he wished.

Oklahoma State University Library Non-Book

Room Hours

Experimental Group Schedule

Monday through Thursday	8:00 a.m. - 11:00 p.m.	60 Hrs.
Friday	8:00 a.m. - 5:00 p.m.	9 "
Saturday	9:00 a.m. - 5:00 p.m.	8 "
Sunday	1:00 p.m. - 10:00 p.m.	9 "
	TOTAL	86 Hrs.

Weekly Slide-Tape Lecture Schedule

Lectures 1, 2, 3 . . . January 21 - January 27
Lectures 4, 5, 6 . . . January 28 - February 3
Lectures 7, 8, 9 . . . February 4 - February 10
Lectures 10, 11, 12. . . February 11 - February 17

One copy of each lecture was kept in the Non-Book Room for review or make-up after the weekly time schedule had passed.

Length of the Study

There were three lectures per week (i.e., Monday, Wednesday, and Friday) with a total of twelve lectures given during the Physical Fitness Unit. One week was used for pre-test examination and dividing the groups. The pre-test was given January 16, 1974. The post-test was given February 18, 1974.

Behavioral Objectives for the Physical Fitness Unit

Upon completion of the Physical Fitness Unit, each student should be able to identify, distinguish, and contrast the lecture material on the following topics:

1. How? What? and Why? of Physical Fitness
2. Health and Skill or Sports Related Fitness
3. Flexibility
4. Strength and Endurance
5. Obesity

6. The Blood Stream
7. The Heart
8. Exercise and the Heart
9. Theories of Heart Disease and Exercise
10. Programs of Exercise
11. Benefits of Exercise
12. Physical Activity Guidelines
13. Skill Learning
14. Posture
15. Body Mechanics
16. Care of the Back
17. Stress and Tension
18. Relaxation

A one-hundred multiple-choice question examination was given during a fifty-minute time period in room 105 of Colvin Physical Education Center. Students' grades were based on the accurate responses to examination questions using the following scale:

A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%,

F = below 60%.

The Instructor/Investigator

The instructor/investigator is David R. Laurie Jr. He is 32 years old and comes to Oklahoma State University from the Department of Health, Physical Education, and Recreation at Kansas State University. While at Kansas State University, Mr. Laurie taught Personal, School, and Community

Health for five years. During these five years, he ranked in the top five per cent of the faculty on the All University Evaluation Questionnaire conducted by the University Testing Service.

Currently, the investigator is a graduate teaching assistant in the Department of Health, Physical Education, and Recreation at Oklahoma State University.

Validity and Reliability of Testing
Instrument (Pilot Study) Used
for Evaluation of Study

Validity is the degree to which a test fulfills its purpose. Validity was demonstrated subjectively and objectively in the following ways.

Curricular validity (i.e., subjective validity) was demonstrated in the construction of the test. The test is valid in that it covers the framework of the subject area presented in the lecture series. Test construction experts agree that the multiple choice type is the most valuable of the objective question forms. In the construction of the test instrument, multiple choice questions were based on the lecture material to be covered during the physical fitness unit. Eight questions were selected from each of the twelve lectures except for the lectures on Strength and Endurance and on Obesity. Ten questions were selected from each of these areas to make a total of one-hundred questions over the unit.

TABLE I
THE PHYSICAL FITNESS UNIT SCHEDULE FOR CONTROL GROUP

Lecture	Date	Topic
1	1/21	Introduction and How? What? and Why? of Physical Fitness, Health and Skill or Sports Related Fitness
2	1/23	Flexibility
3	1/25	Strength and Endurance
4	1/28	Obesity
5	1/30	The Blood Stream
6	2/1	The Heart
7	2/4	Exercise and the Heart
8	2/6	Theories of Heart Disease and Exercise
9	2/8	Programs of Exercise and Benefits of Exercise
10	2/11	Physical Activity Guidelines and Skill Learning
11	2/13	Posture - Body Mechanics - Care of the Back
12	2/15	Stress - Tension and Relaxation
	2/18	Unit Examination

The physical fitness unit test for Personal, School, and Community Health (HPER 2423) demonstrated curricular validity by showing that the items on the test covered the statements of the objectives for the unit as well as the objectives of the course outline.

It may be assumed that curricular validity is demonstrated when the proper emphasis is assigned through appropriate proportions of questions for each part, and when the items in the test are carefully constructed.

Since validity is often affected by the type of subjects used in the experiment, the test constructor used subjects from a similar population (i.e., students enrolled in the Personal, School, and Community Health course, fall semester, 1973) for whom the test was intended for the coming spring semester. It is assumed that the subjects of the fall semester would range in similar ability to those enrolling for the spring semester of the Personal, School, and Community Health course.

A test-retest reliability was run on the results of the pilot pre-test and post-test. A Pearson Product Moment Correlation Coefficient was used to determine the reliability coefficient.

A Split-Half Reliability was run using a Pearson Product Moment Correlation Coefficient to determine the reliability coefficient, and this coefficient was adjusted using the Spearman Brown Prophecy formula.

The above reliabilities were calculated using the

BMD 02D Program Correlation with transgeneration on an I.B.M. 360 computer. The results showed a high correlation for both the test-retest and split-half reliability. The pilot test was used as the pre-test and post-test for the study.

The purpose of this investigation was to determine if there was any statistically significant difference on post-test scores between two randomly assigned groups of students after treatment. An analysis of covariance with multiple covariates was used to determine statistically significant difference. A canned program from the Biomedical Unit BMD 04V was run on the I.B.M. 360 computer.

CHAPTER IV

RESULTS

Results From the Pilot Study for Reliability of the Instrument

The students in the pilot study were students enrolled in the Personal, School, and Community Health course (2423) for the fall semester, 1973. They should compare favorably with the students for whom the instrument was intended because the course has attracted students from many areas of the university population in the past.

The students were not exposed to a treatment or a unit of study prior to, or following, the pilot pre-test or post-test.

The pilot pre-test was submitted to a committee of judges (i.e., Dr. Betty Abercrombie, Dr. John Bayless, and Dr. A. B. Harrison) of the Department of Health, Physical Education, and Recreation of Oklahoma State University. The committee examined the test questions for structure and content related to physical fitness. Upon the approval and recommendations of the committee, the pilot pre-test and/or post-test was ready for use in the study.

The size of the pilot group was 68 students. Each of

these students took the pre-test and the post-test at the given time. Some students were eliminated because they improperly filled out the answer card, or because they failed to complete the pre-test or the post-test; therefore, a correlation could not be run on their scores.

The pilot pre-test was administered on December 7, 1973, and the post-test was given on December 12, 1973. The examinations were given during the regular class meeting times.

Test/Re-Test Reliability

A test-retest reliability was run on the results of the examinations. A Pearson Product Moment Correlation Coefficient was used to determine the reliability coefficient. The test-retest results produced a .83 reliability coefficient, which represents a measure of stability of the instrument over time.

Split-Half Reliability

A split-half reliability was run using a Pearson Product Moment Correlation Coefficient to determine the reliability coefficient and then adjusting this coefficient using the Spearman Brown Prophecy formula. The results produced a coefficient of .88 for reliability, which is a measure of the internal consistency of the instrument. The first administration of the test was used to determine the split-half reliability.

The test/retest reliability coefficient of .83 and the split-half reliability coefficient of .88 are both favorable and rank in the "very high" category for correlations.

Results of the Pre-Test and Post-Test
of the Study

The author has compared the lecture method of instruction and the tutorial (slide-tape) method of instruction for a health class unit on physical fitness. An analysis of covariance was used on the total population using the pre-test as the covariate and the post-test as the dependent variable. The following data were received from the procedures applied in the study.

Table II shows the lecture group covariate mean was 41.5714 and the dependent variable mean was 73.7347.

TABLE II
VARIABLE MEANS FOR THE LECTURE GROUPS COMBINED

Variable	Mean
Covariate (Pre-Test)	41.5714
Dependent (Post-Test)	73.7347

For the tutorial group, Table III, the covariate mean was 42,6600, and the dependent variable mean was 72.1800. There was a covariate mean difference of 1.0886 for the total population at the beginning of the study, and at the conclusion of the treatment there was a dependent mean difference of 1.5547. Neither of these mean differences represented a statistically significant difference between groups at the beginning or the conclusion of the study.

TABLE III
VARIABLE MEANS FOR THE TUTORIAL GROUPS COMBINED

Variable	Mean
Covariate (Pre-Test)	42.6600
Dependent (Post-Test)	72.1800

Table IV represents the analysis of covariance for the combined groups of 8:30, 10:30, and 1:30. A calculated F of 2.379 was obtained from the data collected which is far below the tabled F of 3.94 that was needed to be statistically significant at the .05 level of significance.

TABLE IV
ANALYSIS OF COVARIANCE OF LECTURE AND TUTORIAL GROUPS
COMBINED (8:30, 10:30, and 1:30)

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F
Treatment	146.0234	1		2.379*
Error	5892.6250	96	61.3815	
Total	6038.6484	97		

*p < .05

The table of adjusted means and standard errors for the total population is represented in Table V. The adjusted mean for the lecture group was 74.1800 with a standard error of 1.1206 while the tutorial group had an adjusted mean of 71.7435 and a standard error of 1.1093.

TABLE V
TABLE OF ADJUSTED MEANS AND STANDARD ERRORS OF TOTAL GROUPS

Treatment	Treatment Mean	Adjusted Mean	Standard Error Adjusted
Lecture	73.7347	74.1800	1.1206
Tutorial	72.1800	71.7435	1.1093

Tables VI, VII, VIII, and IX all represent data collected from the 8:30 section only. Table VI shows a covariate mean of 40.6000 and a dependent mean of 73.1333 for the 8:30 a.m. group.

TABLE VI
VARIABLE MEANS FOR THE 8:30 A.M. LECTURE GROUP

Variable	Mean
Covariate (Pre-Test)	40.6000
Dependent (Post-Test)	73.1333

Table VII shows the covariate mean of the 8:30 a.m. group to be 44.7500 and the dependent mean of 73.1875 for the tutorial group. This indicates a covariate mean difference of 4.1500 in favor of the tutorial group at the onset of the experiment. The dependent mean difference was .0542 in favor of the tutorial group at the conclusion of the treatment. The 8:30 a.m. lecture group showed a mean gain of 32.5333 while the tutorial group showed a mean gain of 28.4375.

TABLE VII
 VARIABLE MEANS FOR THE 8:30 A.M. TUTORIAL GROUP

Variable	Mean
Covariate (Pre-Test)	44.7500
Dependent (Post-Test)	73.1875

Table VIII presents data from the analysis of covariance for the 8:30 section for both the lecture and the tutorial groups. The table shows there was no statistically significant difference between the two groups at the .05 level of significance. The calculated F of the analysis of covariance was 1.522; however, the tabled F needed for significance was 4.20.

TABLE VIII
 ANALYSIS OF COVARIANCE OF LECTURE AND TUTORIAL GROUPS
 OF THE 8:30 A.M. SECTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F
Treatment	93.2031	1		1.522*
Error	1714.6631	28.	61.2380	
Total	1807.8662	29		

*p < .05

The table of adjusted means and standard errors for the 8:30 a.m. group appears in Table IX. The adjusted mean for the lecture group was 75.0268 with a standard error of 2.0646. The adjusted mean for the 8:30 a.m. tutorial group was 71.4124 with a standard error of 1.9964.

TABLE IX

TABLE OF ADJUSTED MEANS AND STANDARD ERRORS
OF THE 8:30 A.M. LECTURE AND
TUTORIAL GROUPS

Treatment	Treatment Mean	Adjusted Mean	Standard Error Adjusted
Lecture	73.1333	75.0268	2.0646
Tutorial	73.1875	71.4124	1.9964

Tables X, XI, XII, and XIII represent data collected from the 10:30 a.m. section only. Table X shows a covariate mean of 41.3840 and a dependent mean of 71,8571 for the 10:30 a.m. lecture group.

TABLE X
VARIABLE MEANS FOR THE 10:30 A.M. LECTURE GROUP

Variable	Mean
Covariate (Pre-Test)	41.3810
Dependent (Post-Test)	71.8571

Table XI shows the covariate mean of 41.7368 and the dependent mean of 71.7368 for the tutorial group. This indicated a covariate mean difference of 0.3558 in favor of the tutorial group at the onset of the experiment. The dependent mean difference was 0.1203 in favor of the lecture group at the conclusion of the treatment. The 10:30 a.m. lecture group showed a mean gain of 30.4761 while the tutorial group showed a mean gain of 30.0000.

TABLE XI
VARIABLE MEANS FOR THE 10:30 A.M. TUTORIAL GROUP

Variable	Mean
Covariate (Pre-Test)	41.7368
Dependent (Post-Test)	71.7368

Table XII shows there was no statistically significant difference between the two groups at the .05 level of significance. The calculated F for the analysis of covariance was 0.033; however, the tabled F needed for significance was 4.11.

TABLE XII
ANALYSIS OF COVARIANCE OF LECTURE AND TUTORIAL GROUPS
OF THE 10:30 A.M. SECTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F
Treatment	1.8572	1		0.033*
Error	2072.2166	37		
Total	2074.0737	38		

*p < .05

The table of adjusted means and standard errors for the 10:30 a.m. group appears in Table XIII. The adjusted mean for the lecture group was 72.0056, with a standard error of 1.6333. The adjusted mean for the 10:30 tutorial group was 71.5727, with a standard error of 1.7171.

TABLE XIII

TABLE OF ADJUSTED MEANS AND STANDARD ERRORS OF THE
10:30 A.M. LECTURE AND TUTORIAL GROUPS

Treatment	Treatment Mean	Adjusted Mean	Standard Error Adjusted
Lecture	71.8571	72.0056	1.6333
Tutorial	71.7368	71.5727	1.7171

Tables XIV, XV, XVI, and XVII represent data collected from the 1:30 p.m. section only. Table XIV shows a covariate mean of 43.0000 and a dependent mean of 77.4615 for the 1:30 p.m. lecture group.

TABLE XIV

VARIABLE MEANS FOR THE 1:30 P.M. LECTURE GROUP

Variable	Mean
Covariate (Pre-Test)	43.0000
Dependent (Post-Test)	77.4615

Table XV shows the covariate mean of 41.6000 and the dependent mean of 71.6667 for the tutorial group. This indicated a covariate mean difference of 1.4000 in favor of the lecture group at the onset of the experiment. The dependent variable mean difference was 5.7948 in favor of the lecture group at the conclusion of the treatment. The 1:30 p.m. lecture group showed a mean gain of 34.4615 while the tutorial group showed a mean gain of 30.0667.

TABLE XV
VARIABLE MEANS FOR THE 1:30 P.M. TUTORIAL GROUP

Variable	Mean
Covariate (Pre-Test)	41.6000
Dependent (Post-Test)	71.6667

Table XVI shows the analysis of covariance data for the 1:30 p.m. group. There was no statistically significant difference between the two groups at the .05 level of significance. The calculated F for the analysis of covariance was 2.243; however, the tabled F needed for significance was 4.24.

TABLE XVI
ANALYSIS OF COVARIANCE OF LECTURE AND TUTORIAL GROUPS
OF THE 1:30 P.M. SECTION

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Sum of Squares	F
Treatment	167.4346	1		2.243*
Error	1866.2358	25	74.6494	
Total	2033.6704	26		

*p < .05

The table of adjusted means and standard errors for the 1:30 p.m. group appears in Table XVII. The adjusted mean for the lecture group was 76.9950 with a standard error of 2.4016. The adjusted mean for the 1:30 p.m. tutorial group was 72.0709 with a standard error of 2.2351.

TABLE XVII
TABLE OF ADJUSTED MEANS AND STANDARD ERRORS OF THE
1:30 P.M. LECTURE AND TUTORIAL GROUPS

Treatment	Treatment Mean	Adjusted Mean	Standard Error Adjusted
Lecture	77.4615	76.9950	2.4016
Tutorial	71.6667	72.0709	2.2351

TABLE XVIII
COMPOSITE OF TREATMENT MEANS

Section	Pre-Test	Post-Test	Mean Gain
Total Group Lecture	41.5714	73.7347	32.1633
Total Group Tutorial	<u>42.6600</u>	<u>72.1800</u>	<u>29.5200</u>
Difference	1.0885	1.5547	2.6433
8:30 Lecture	40.6000	73.1333	32.5333
8:30 Tutorial	<u>44.7500</u>	<u>73.1875</u>	<u>28.4375</u>
Difference	4.1500	0.0542	4.0958
10:30 Lecture	41.3810	71.8571	30.4761
10:30 Tutorial	<u>41.7368</u>	<u>71.7368</u>	<u>30.0000</u>
Difference	0.3558	0.1203	.4761
1:30 Lecture	43.0000	77.4615	34.4615
1:30 Tutorial	<u>41.6000</u>	<u>71.6667</u>	<u>30.0667</u>
Difference	1.4000	5.7948	4.3948

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this investigation was to determine whether there was any statistically significant difference on post-test scores between two randomly assigned groups of students after attending either the lecture method of instruction or the tutorial (slide-tape) method of instruction on a unit of study on physical fitness.

Conclusions

Based on the data the following conclusions were formulated:

(1) When the total population (8:30 a.m., 10:30 a.m., and 1:30 p.m.) was compared there was no statistically significant differences, at the .05 level of significance, between the lecture or tutorial groups as measured by the post-test using the pre-test as a covariate; however, both groups had shown a mean increase in achievement. It may be concluded that both groups improved during the treatment, although at the time of the post-test there was no statistically significant difference in improvement between the groups.

(2) The 8:30 a.m. section showed no statistically

significant difference at the .05 level of significance between the lecture or tutorial groups as measured by the post-test using the pre-test as a covariate; however, both groups recorded a mean increase in achievement. It may be concluded that both groups improved during the treatment; however, the difference in improvement was not statistically significant between the groups.

(3) The 10:30 a.m. section recorded no statistically significant difference at the .05 level of significance between the lecture and tutorial groups as measured by the post-test using the pre-test as a covariate; however, both groups recorded a mean increase in achievement. It may be concluded that both groups improved during the treatment; however, the difference in improvement was not statistically significant between the groups.

(4) The 1:30 p.m. section results were similar to the 8:30 a.m. and the 10:30 a.m. results. There was no statistically significant difference at the .05 level of significance between the lecture and tutorial groups as measured by the post-test using the pre-test as the covariate; however, both groups recorded a mean increase in achievement. It may be concluded that both groups improved during the treatment; however, the difference in improvement was not statistically significant between the groups.

In summary, it may be concluded that both the lecture and the tutorial methods of instruction were effective in producing mean gains in improvement; however, neither method

was statistically more effective than the other. The comparisons were made as a total population (8:30 a.m., 10:30 a.m., and 1:30 p.m.), as well as individually, on an hourly basis. The data revealed there was no statistically significant difference between the lecture or tutorial methods as a total population or for the 8:30 a.m., 10:30 a.m., or 1:30 p.m. sections individually. With no statistically significant difference between treatment methods or time of section indicated, no further data processes were made.

Based on the data presented, it can be concluded that the lecture and the tutorial method of instruction both produced mean gains in improvement; however, neither was statistically superior to the other. As reflected in the scores of the students, either the lecture or tutorial methods would produce similar cognitive results as an effective method of instruction for a unit of study on physical fitness as outlined in the procedures of this study.

Recommendations

The basic efficiency of two teaching methods was examined, and the lecture method of instruction and the tutorial (slide-tape) method of instruction seemed to be equally efficient in regard to the test score improvement by students exposed to either treatment. With the acceptance of the null hypotheses, which stated there would be no statistically significant difference between the experimental group and the control group when their post-test scores

were compared, the following recommendations are made for possible use of the findings of this investigation.

A lecture or tutorial unit on physical fitness could be offered to students enrolling in HPER 2423, Personal, School, and Community Health, at Oklahoma State University. This option would give the student a choice of either instructional method without loss of student achievement or performance. In this investigation, students who were randomly selected attained equally favorable results with the lecture and tutorial methods of instruction. Performance could possibly be improved by allowing the student to select, as a personal choice, his or her preferred method of instruction. This could be done by using designated enrollment notation to identify instructional methods.

A second recommendation would be that missed, make-up, or review lectures could be acquired by the student at a later time with the use of the tutorial (slide-tape) method. A student missing or desiring to review a lecture could do so at his or her convenience by acquiring the necessary lecture in a tutorial (slide-tape) situation.

A third possibility would be to have the health unit on physical fitness alternated or a split-half method used in conjunction with another unit of the course. For example, a unit topic of sex, drugs, or family relations could be alternated with the unit on physical fitness. This split-half grouping would allow the instructor to send one-half of the class to a tutorial (slide-tape) unit on physical

fitness, which would be designed as a cognitive or a factual unit; at the same time, the other one-half of the class could work on more intimate affective material in the regular classroom setting with the instructor. This method would enable the instructor to have more personal contact with the students while instructing the areas of personal or affective units of the course.

A final recommendation would be to use the tutorial (slide-tape) method as a possible extension, correspondence, independent study, or community service educational program. The instructional units could be programmed and distributed for off-campus use by all interested persons. The convenience of the programs would be a key selling point to the student. Time, expense, travel, and level of material could be controlled by the programmer. Motivation of the learner could be captured by providing the instructional material when, where, and how the student wanted it.

Future research would be desirable to negate or substantiate the findings of this investigation. The possibilities for future use of a tutorial (slide-tape) method of instruction in teaching of a physical fitness unit in health classes has a researched basis for justification as a result of this study. This study should encourage instructors to explore the possible use of this type of instruction in other subject areas. It is not suggested that the tutorial (slide-tape) method of instruction is a cure-all, or that all courses should use this method of instruction; however,

it should be considered as an acceptable alternative method of instruction to the lecture. The lecture and/or tutorial (slide-tape) option as viewed by the student could produce gains in learning and motivation.

Further research is recommended to determine whether the students of either treatment method would retain the desired information for longer periods of time, and what effect the quality of instruction has on the outcome of a treatment method.

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APPENDIX A

CORRESPONDENCE

SINGER

EDUCATION DIVISION

EDUCATION SYSTEMS
3750 MONROE AVENUE
ROCHESTER, N. Y. 14603
(716) 586-2020

SINGER
EDUCATION & TRAINING PRODUCTS

October 31, 1973

MM447-73

XXXXXXXXXXXX

Mr. David R. Laurie, Jr.
Dept. of Health, Physical Education
and Recreation
Colvin Physical Education Center
Oklahoma State University
Stillwater, Oklahoma 74074

Dear Mr. Laurie:

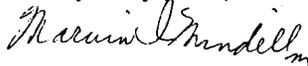
Thank you for your letter of October 22nd to Mr. Nehr. We here at Singer Education Systems are most interested in your work. Specifically in reply to your request, there is no literature relating to use or leading to the development of the Caramate Sound-Slide Projector. Actually, although successful in the market place, the Caramate is quite new, being in distribution less than one year. Development of this type of device was initiated as a result of our experience in the manufacture of rear screen-sound filmstrip equipment and our conviction that the horizontal, circular tray was the major slide handling and storage device. To our knowledge, there is nothing in the form of articles and papers written with respect to the Caramate.

I have posed the question to our Marketing people of making units available on a loan basis for use in your study. However, due to the overwhelming success of this product, all the immediate production has been allocated and it would be impossible to make any units available directly from our factory at the present time. Therefore, it has been suggested that you contact our dealer in your area who might be able to work with you on a satisfactory rental arrangement. The dealer in your area is:

Fairview Audio-Visual Co.
1515-B South Sheridan Road
Tulsa 74112
Tel: 918-836-6773

As was stated above, we are interested in your work and would like to be kept informed of your findings as they develop.

Very truly yours,



Marvin I. Mindell
Vice President
Engineering

WM. C. BROWN COMPANY PUBLISHERS

2450 Kerner Boulevard,

Dubuque, Iowa 52001

Telephone 315 588-1451

web

December 3, 1973

Mr. David R. Laurie, Jr.
Colvin Physical Education Center
Oklahoma State University
Stillwater, Oklahoma 74074

Dear Mr. Laurie:

With reference to your letter of November 29th, please be advised that you have our permission to photograph the visual aids in the back of our book INSTRUCTOR'S HANDBOOK FOR CONCEPTS IN PHYSICAL EDUCATION by Corbin, et al to be made into slides to be used for classroom instruction. We understand that these slides will not be sold, nor will a fee be charged for their use.

Sincerely,

Twila D. Griffith
(Mrs.) Twila D. Griffith
Permissions Department

tdg

APPENDIX B

A SUMMARY OF THE CARAMATE ELECTRICAL
AND MECHANICAL SPECIFICATIONS

A SUMMARY OF THE CARAMATE

ELECTRICAL AND MECHANICAL SPECIFICATIONS

2" x 2" slide rear-screen projection cassette; standard 2-track separate program each side, monoaural-playback and record-Record mode volume auto-Playback speed 1-7/8" per sec. - Automatic cartridge eject - Synchronization; 1000 cycle pulse cuing - Audio and pulse erase capability - Transistorized amplifier - Frequency response 150 Hz, 7 KHx - Audio output 1w - 3" x 5" 8 ohm, oval ceramic PM speaker - 9" x 9" wide angle, high contrast viewing screen - f/3.5 45 mm anti-static coated lens - CAR tru-focus lamp; 50 hr. average lamplife - 1/4" earphone jack - Pilot light - Cabinet mounted carrying handle-Cassette storage - No-mar rubber feet - Pushbutton controls; cassette; record, play, fast-forward, fast-rewind, stop/eject - Slide advance, select, hold - pushbutton on/off - Focus-Linear slide type volume control - Recording VU meter - 8 ft. 3-wire power cord with storage - UL/CSA listed - 250w power consumption - 117v, 60 Hz - 11-1/2" L x 12-1/2" W x 13-1/2" H - Weight 18-1/2 lbs.

Model 8806 Playback and Record
 Model 8805 Playback Only

APPENDIX C

CLASS ITINERY FOR HPER 2423

PERSONAL, SCHOOL, AND

COMMUNITY HEALTH

(SPRING 1974--GIVEN TO ALL STUDENTS)

HPER 2423
Personal, School and Community Health
Spring, 1974

Team Teachers:

Mr. David R. Laurie

Office: PEC 110

Phone: 372-6211, x. 6356

Office hours: MWF 9:30-10:30

MWF 2:30-3:30 or by app't.

Ms. Barbara Cotton

Office:

Phone:

Office hours:

Textbook: CRM, Inc., Life and Health, Del Mar, California: CRM, Inc.
1972

M	Jan. 14	Classes Begin; Orientation
W	16	General Information Exam
F	18	Background Questionnaire
M	21	UNIT I: PHYSICAL FITNESS--The How? What? and Why?
W	23	Flexibility
F	25	Strength and Endurance
M	28	Obesity
W	30	The Blood Stream
F	Feb. 1	The Heart
M	4	Exercise and the Heart
W	6	Theories of Heart Disease and Exercise
F	8	Programs of Exercise and Benefits of Exercise
M	11	Physical Activity Guidelines and Skill Learning
W	13	Posture--Body Mechanics--Care of the Back
F	15	Stress--Tension and Relaxation
M	18	Unit I Examination (Major) 100 Questions
W	20	UNIT II: MENTAL AND EMOTIONAL FITNESS AND CHEMICAL ALTERATION OF BEHAVIOR--Chapters #1 and #30
F	22	#3, Physiological Basis of Behavior
M	25	#4, Psychological Development
W	27	#5, Mental Health and Mental Illness
F	Mar. 1	Guest Lecturer or Film (Guidance Center, etc.)
M	4	#6 and #7, Film: CRM, Dependence: A New Definition
W	6	#10 and #11, Film: Marijuana--The Great Escape
F	8	Sub-Unit Exam--50 Questions; Ch. 1, 3, 4, 5, 6, 7, 10, 11, 30
M	11	
thru		SPRING RECESS
F	15	
M	18	Film: Alcoholism
W	20	Ch. #8, Alcohol
F	22	#9, Film: Breath of Air (Smoking)
M	25	#9, Film: Is It Worth Your Life?
W	27	#23, Film: Investment in Life
F	29	#23, Film: Life and Breath

M	Apr. 1	Sub-Unit Exam #2--50 Questions, Ch. 8, 9, 23
W	3	UNIT III: FAMILY, CONSUMER, AND SCHOOL HEALTH Ch. #12, Film: Human Reproduction
F	5	#12
M	8	#13; Film: A Normal Birth
W	10	#13; Film: To Plan Your Family
F	12	#15
M	15	#16 and #22 (Pages 437-443) Film: VD--A New Focus or VD--Every Thirty Seconds
W	17	Sub Unit Exam--50 Questions, Ch. 12, 13, 15, 16, and 22
F	19	#26
M	22	#27
W	24	#28
F	26	#29
M	29	Services in School Health
W	May 1	Curriculum in School Health
F	1	Instruction in School Health; Film: Looking at Children

Final Exams: 8:30 Wednesday, May 8, 4:00 - 5:50
 10:30 Wednesday, May 8, 9:30 - 11:20
 1:30 Thursday,

Final is a Sub-Unit Exam--50 Questions; Ch. 26, 27, 28, 29, and School Health.

Action Tasks:

Study approaches to Units II and III. The students will choose their own Action Task groups. There will be 10 Action Task groups with no more or less than four (4) students in each group. The Action Task topics will be given out after the Unit I examination of February 18 or during the class lecture of February 20. The grades (scores) for the Action Task projects will be evaluated on the following criteria: (1) Review of related literature, (2) Innovation, (3) Validity, and (4) Presentation. Each student will get a score for his or her participation in the Action Task.

Grades:

Unit I:	Physical Fitness Unit Examination	100 Questions 100 Points
Unit II:	Mental and Emotional (Sub-Unit Exam) Fitness and Chemical Alteration of Behavior	50 Questions 50 Points
	(Sub-Unit Exam)	50 Questions 50 Points
Unit III:	The Family, Consumer, (Sub-Unit Exam) and School Health	50 Questions 50 Points
	(Sub-Unit Exam)	50 Questions 50 Points
		<u>50 Points</u>
	EXAM TOTAL	300 Questions and Points
	Action Task (Possible)	<u>50</u> Points
	GRAND TOTAL	350 Points Possible

Grading Scale: (90%, 80%, 70%, etc.)

- A = 90% or 315 Points
- B = 80% or 280 Points
- C = 70% or 245 Points
- D = 60% or 210 Points
- F = Below 210 Points

Attendance:

Students will be held responsible for class attendance. When class is scheduled to meet, you are expected to be there. Irregular attendance will be dealt with on an individual basis to the tune of FIVE (5) points cut from total score per cut from class. Each student will be given three (3) cuts with no questions asked. I don't like it either, but we need you to make our class and your grades.

Objectives:

1. The student should be able to relate the basic factual information in the various content areas of health science which serves as a basis in helping to meet personal needs and problems.
2. The student should be able to interpret the place of health and health education in the broader educational and social perspective.
3. The student should be able to critically evaluate health information, materials, products, common beliefs, and services in order to establish a sound basis for personal action.
4. The student should function effectively in the group inquiry sessions by making full use of available resources and services.
5. The student should be able to identify attitudes and wholesome health behavior which are conducive to maintaining and improving personal and community health.
6. The student should understand all aspects of the school health program.
7. The student should understand the role of the teacher in the school health program.

APPENDIX D
HANDOUT FOR TUTORIAL STUDENTS
ENROLLED IN HPER 2423
PERSONAL, SCHOOL, AND
COMMUNITY HEALTH
SPRING 1974

I. Welcome!

Your Personal, School, and Community Health class will be meeting in the Non-Book Room of the OSU Library for the first four weeks of lecture (Jan. 21 thru Feb. 15). You will return to Room 105 P. E. Center (Colvin Hall) for your Unit I Examination on February 18th during your regularly scheduled time (Sec. #1: 8:30, Sec. #2: 10:30, and Sec. #3: 1:30). The class will regroup and start the interaction and discussion portion of the class.

II. The Non-Book Room of the OSU Library

Your next 12 lectures will be held in the Non-Book Room (first floor, southeast corner) at your convenience. The Non-Book Room is open 86 hours a week for your convenience. The schedule is as follows:

Monday through Thursday	8:00 a.m. - 11:00 p.m.	60 hours
Friday	8:00 a.m. - 5:00 p.m.	9 hours
Saturday	9:00 a.m. - 5:00 p.m.	8 hours
Sunday	1:00 p.m. - 10:00 p.m.	<u>9 hours</u>
	TOTAL HOURS	86 hours

The first 12 lectures are recorded slide and tape presentations by your professor.

You will need your plastic ID card to secure the lectures from the library clerk. So please bring it to the lecture. Each lecture will be at your disposal for seven days. This means you have 86 hours to attend three lectures. The lectures are only available at the scheduled dates.

Lectures # 1, 2, 3	Jan. 21 - Jan. 27
Lectures # 4, 5, 6	Jan. 28 - Feb. 3
Lectures # 7, 8, 9	Feb. 4 - Feb. 10
Lectures #10, 11, 12	Feb. 11 - Feb. 17

You may view each lecture as many times as you wish during the week. Roll will be taken by the library clerk and collected weekly by your professor.

III. The Singer Caramate:

Yes! The same company that made your Mom's sewing machine! The slide and tape lectures will be seen on the Singer Caramate Rear Screen Projector. Directions will be given to you by the clerk, However, keep these with you.

1. Secure slides and tape from clerk.
2. Select one of four Caramates to use.
3. Position slide tray on top of Caramate.
4. Insert cassette tape in side of projector with large tape portion up (Push Stop Eject button, to open side door).

5. Put on "head-set" and push Power button (upper left portion of machine).
6. Push ADVANCE button (next to power button) and draw up first slide.
7. The first few slides are vocabulary words for your lecture. By use of ADVANCE button, advance vocabulary words, at your own rate until you get to a slide titled "The Country Parson" (a saying).
DO NOT ADVANCE THIS SLIDE!!
8. Push PLAY button (right side of machine) and adjust volume (lower right of machine).
9. Listen to lecture: It will be synchronized and go all by itself.
10. When the lecture is completed, push STOP/EJECT button LIGHTLY. The tape will stop. If you push it too hard, the tape will stop and eject. If so, re-insert the tape.
11. Now push the REWIND button and let the tape rewind the lecture. When you hear a click (stopping of the tape), push the stop/eject button hard and remove the tape.
12. To remove the slides: push the SELECT button in and hold in while you turn the slide tray back to "0". Now lift off the tray.

Thanks for reading this information. I will have office hours in the Non-Book Room on Tuesday and Thursday, 9:00-10:00 and 10:00-11:00 or at your convenience. Call for an appointment at 372-6211, x, 6350 or x. 6371. I hope you enjoy this unit.

Dave Laurie

P.S. Your unit examination (Feb. 18) will be 100 multiple choice questions over information presented in the lectures. Further instruction concerning the exam will be given in lecture #12.

APPENDIX E

TESTING INSTRUCTIONS READ FOR STUDENTS
TAKING THE PRE-TEST JANUARY 16, 1974
AND POST-TEST FEBRUARY 18, 1974

PRE-TEST INSTRUCTIONS

The following examination is a general knowledge examination on physical fitness. The results of this test will not affect your grade in the course. The purpose of this exam is to assess your general knowledge concerning physical fitness. Please do your best and listen carefully as I read the following directions:

1. STUDENT NUMBER: In the student number area of the card, mark your student number, same as your plastic I.D. card number (Mark the appropriate column downward).
2. SECTION: In the space marked SEC, mark the number of your section (8:30 = #1, 10:30 = #2, 1:30 = #3).
3. TEST: In the space marked TEST, mark the number: 1.
4. DATE: To the left of the orange word NAME, put today's date using numbers only (January 16, 1974).
5. NAME: Print your name in space marked NAME.
6. BACK SIDE OF CARD: Turn the card over and record the information on the back side of card (This may be done by tipping the bottom of the card up to turn it over).
7. PLEASE CHECK TO SEE THAT YOU HAVE THE FOLLOWING ON BOTH SIDES OF THE CARD: (2) Student #, (2) Section #, (3) Test #, (4) Date, (5) Name.
8. PLEASE DO NOT MARK ON THE EXAMINATION BOOKLET.
9. There are 100 questions on the examination. Each question has ONLY ONE CORRECT ANSWER.
10. The examination will be scored by a computer, so erase all excess marks on the card.

11. If you have questions during the examination, raise your hand and I will come to you.

12. Upon completion of the examination, bring the test booklet and score card to the front of the room and you are excused.

THANK YOU . . . YOU MAY BEGIN.

POST-TEST INSTRUCTIONS

The post-test cards were filled out in advance of the post-test by the investigator. This was done to insure correct recording of all information. There were a large number of errors on the pre-test recording of student information. (Correction of these errors was made before the tests were graded). For the post-test, the students were handed their score cards with student information pre-recorded for them. The test booklets were passed out and the examination was in session.

APPENDIX F

PRE-TEST AND POST-TEST GIVEN FOR
PHYSICAL FITNESS UNIT IN
PERSONAL, SCHOOL, AND
COMMUNITY HEALTH CLASS
SPRING 1974

PRE-TEST AND POST-TEST

1. Which of the following is not a health-related fitness area?
 - a. endurance
 - b. flexibility
 - *c. balance
 - d. strength

2. The ability to transfer energy into force at a fast rate of speed is:
 - a. agility
 - b. coordination
 - c. speed
 - *d. power

3. At what age do men and women start to decline in fitness?
 - *a. Men--17 Women--11-12
 - b. Men--21 Women--18-19
 - c. Men--21 Women--20-21
 - d. Men--22 Women--22-23

4. Which describes diseases caused by lack of exercise?
 - a. ergotropic
 - b. staminogenic
 - *c. hypokinetic
 - d. kilometric

5. Which is not a true statement?
 - *a. Most cases of back pain are a result of a slipped disc.
 - b. As many as 45% of Americans are too fat.
 - c. 60% of American children cannot pass fitness tests.
 - d. Heart disease is the leading cause of death.

6. What is the basis for dynamic and creative activity?
 - a. fibrositis
 - b. lumbago
 - c. reaction time
 - *d. physical fitness

7. The ability to change position of the entire body in space, i.e., direction and speed:
 - *a. agility
 - b. coordination
 - c. speed
 - d. power

8. Which of the following statements is incorrect?
 - a. Physical fitness consists of many components each of which is specific in nature.
 - *b. Physical fitness needs are the same for everyone.
 - c. Physical fitness is the basis for dynamic, creative activity.
 - d. Physical fitness is improved by physical activity and exercise.

9. The aspect of physical fitness that seems to be long lasting is:
 - a. strength
 - b. endurance
 - *c. flexibility
 - d. speed

10. The type of muscle stretching that appears to be most effective in relieving muscle soreness is:
 - a. ballistic
 - *b. passive
 - c. splints-type
 - d. active

11. The muscle is extended slowly to full length or slightly greater and held for a relatively long time.
 - a. active stretch
 - *b. passive stretch
 - c. stretch reflex
 - d. dynamic flexibility

12. Bouncing or jerking against the muscle in an attempt to produce greater muscle length is called:
 - a. stretch reflex
 - *b. ballistic stretch
 - c. static stretch
 - d. shin splints

13. Static stretch is the same as:
 - *a. passive stretch
 - b. stretch reflex
 - c. ballistic stretch
 - d. ventricle stretch

14. Which muscle group is likely to cause referred pain?
 - a. pectoralis
 - b. psoas
 - c. achilles
 - *d. hamstring

15. Which is not true of ballistic stretch?
 - a. induces stretch reflex
 - *b. may caus excessive muscle bulk
 - c. may cause soreness
 - d. may result in injury

16. When a person touches a hot stove and automatically withdraws his hand, this is an example of:
 - a. static stretch
 - *b. stretch reflex
 - c. dynamic reflex
 - d. range reflex

17. Doing 24 push-ups is an example of:
- strength
 - *b. muscular endurance
 - flexibility
 - cardiovascular endurance
18. Which is a good exercise for dysmenorrhea?
- Larson's exercise
 - *b. Billig's exercise
 - torso flexor
 - lateral twist exercise
19. Which principle of strength says that "you build the muscles you exercise"?
- all or none
 - progression
 - recruitment
 - *d. specificity
20. Which of the following muscle tissues consist of long spindle shaped fibers that function as movers of internal organs?
- *a. smooth
 - cardiac
 - skeletal
 - myocardium
21. Which exercise routine is best for muscular endurance?
- high weight--high reps
 - high weight--low reps
 - *c. low weight--high reps
 - low weight--low reps
22. A type of muscular contraction in which the tension remains constant but the muscle length is changed:
- *a. isotonic
 - isometric
 - motor unit
 - muscle fiber
23. Which term describes the deterioration of muscle?
- fibrillation
 - latency
 - attenuation
 - *d. atrophy
24. The best strength development program for fitness would be:
- all isometric
 - *b. isometric and isotonic
 - all isotonic
 - isotrophy

25. To what does the principle of recruitment refer?
- a. over-development of muscle boundness
 - *b. innervation of an optimal number of muscle fibers
 - c. development through lengthening contractions
 - d. isometric exercise training
26. One problem with this type of exercise is the inability of some to be motivated to maximal performance.
- a. isotonic
 - *b. isometric
 - c. Isobillig's
 - d. isocomo
27. Which of the following is a false statement?
- a. Less than 3% of people who are fat have glandular trouble.
 - b. 3 of 4 people who are obese have a family history of obesity.
 - c. 1 of 8 people are at least 20% overweight.
 - *d. In order to lose a pound of fat a person must "expend" 8500 calories.
28. What is the best rule for maintaining desirable weight?
- a. maintain the same diet throughout life
 - *b. maintain ideal weight of age 25
 - c. maintain weight recommended by height-weight-age charts
 - d. lose 10 pounds for each 10 years after 20
29. Which is most true?
- a. About 20% of American adults are too fat.
 - b. Few children are too fat.
 - c. Appetite increases with moderate exercise.
 - *d. Fat children become fat adults.
30. How many pounds can you reasonably expect to lose in a week by dieting?
- *a. 1-4
 - b. 3-6
 - c. 5-8
 - d. 7-11
31. Which is true?
- a. Obese people have five times the death rate of lean people.
 - *b. Most fat people have fat parents.
 - c. Most dieters lose the weight they set out to lose.
 - d. Most fat people have glandular problems.
32. The odds against an overweight child becoming a normal weight adult are?
- a. 3-3
 - *b. 4-1
 - c. 8-4
 - d. 1-8

33. Which of the following is not a factor in weight control?
- decrease caloric intake
 - increase caloric expenditure
 - *c. basal metabolism goes up with age
 - d. combination of #1 and #2
34. The best indicator of obesity is?
- waist girth
 - *b. underwater weighing
 - c. diameter of right wrist
 - d. skinfold measurements
35. Who is most likely to float in a water environment?
- a distance runner
 - *b. a sumo wrestler
 - c. a football quarterback
 - d. a tennis pro
36. Less than _____ percent of people who are fat have gland trouble.
- 20
 - *b. 3
 - c. 14
 - d. 10
37. Which is not a theory of atherosclerosis?
- Fibrin Theory
 - Lipid Theory
 - *c. Collateral Circulation Theory
 - d. fibrositis
38. Which is a true statement?
- *a. Arteries may constrict to divert blood to needed body parts.
 - b. Blood nourishes the heart as it passes through the ventricle.
 - c. Atherosclerosis is the cause of varicose veins.
 - d. Hemoglobin is an antibody which fights infections.
39. Which is not a blood fat?
- Cholesterol
 - Triglyceride
 - Phospholipid
 - *d. Cortocoids
40. Blood flows from arteries to capillaries to veins. Which statement about these structures is true?
- a. Because of their restrictive muscles, arteries cannot expand.
 - b. Arteries, such as the cardiac arteries, have no constrictive ability.
 - c. Veins are more muscular than arteries.
 - *d. Veins have valves in them to prevent backflow.

41. Which is characterized by deposits on the walls of arteries?
- *a. atherosclerosis
 - b. arteriosclerosis
 - c. lumbago
 - d. sciatica
42. It is important to gradually taper off exercise for which reason?
- a. to keep supplying oxygen to the legs
 - *b. to improve venous blood return
 - c. to prevent muscle soreness
 - d. to eliminate muscle cramps
43. Tiny round discs, manufactured in the bone marrow, that carry oxygen to the tissues and remove carbon dioxide are called?
- *a. erythrocytes
 - b. leucocytes
 - c. adventia
 - d. fibrillation
44. A term used to describe conditions which cause the arterial walls to become thick, hard, and lose elasticity--hardening of the arteries.
- a. anemia
 - b. erythrocytosis
 - c. leucocytosis
 - *d. arteriosclerosis
45. What is another name for a heart attack?
- a. angina pectoris
 - b. atherosclerosis
 - c. coronary vascularization
 - *d. thrombosis
46. A coronary occlusion causes:
- a. hyperventilation
 - *b. ischemia
 - c. fibroplasia
 - d. lipid deposits
47. What is the basis of the O₂ pump theory?
- *a. A large stroke volume improves heart efficiency.
 - b. Aerobics is the basis for running.
 - c. Cholesterol may cause atherosclerosis.
 - d. A heart attack is caused by a blood clot.
48. The period of relaxation during the heart cycle is called the:
- a. atrium
 - b. systole
 - *c. diastole
 - d. triadium vastus

49. Which of the following routes is the correct path of blood flow through the heart (excluding lungs)?
- a. left atria to right ventricle to right atria to left ventricle to body
 - b. right atria to left atria to right ventricle to left ventricle to body
 - *c. right atria to right ventricle to left atria to left ventricle to body
 - d. left atria to right atria to right ventricle to left ventricle to body
50. All of the following statements are true except:
- a. The heart converts about half of its fuel into energy.
 - *b. The average normal resting heart beats 92 beats per minute.
 - c. As a machine the heart is more efficient than an automobile.
 - d. The heart pumps about 10 tons of blood each day.
51. Pulse rates of a trained athlete are likely to be in the range of:
- a. 20's and 30's
 - *b. 40's and 50's
 - c. 60's and 70's
 - d. 80's and 90's
52. Infarction refers to which of the following?
- *a. death of heart tissue
 - b. distraction of light
 - c. irregular heart beat
 - d. high blood pressure.
53. Exercise to prevent coronary heart disease
- a. is a proven, permanent preventative
 - b. is the only way an individual can reduce the risk
 - *c. is probably even more important to men than women
 - d. is probably even more important to women than men
54. The blocking of the coronary blood vessels is called:
- *a. coronary occlusion
 - b. post mortem
 - c. sedentary style
 - d. kinesthesia
55. Physically inactive people are called:
- *a. sedentary
 - b. fibrillation
 - c. pericardium
 - d. systolic
56. Which is a true statement?
- a. A concentric contraction is a lengthening contraction.
 - b. Hypertrophy refers to taking blood samples.
 - c. Sit ups should be done with the legs straight.
 - *d. To build the heart, it must be overloaded.

57. What is the best measure of cardiovascular fitness?
- 12-minute run
 - the step test
 - the bicycle test
 - *d. max O₂ test
58. Any of the conditions which predispose to heart disease are called:
- post mortem
 - *b. risk factors
 - sedentary
 - myocardium
59. Work done in the presence of oxygen is called:
- isometric
 - *b. aerobic
 - anaerobic
 - kinesthesia
60. For an increase in cardio-respiratory efficiency to occur:
- One should do lots of stretching exercises.
 - *b. The heart rate should be elevated to around 140 BPM for 10-15 minutes.
 - One should do isometric exercises only.
 - One should do isometric and isotonic exercises.
61. Vagal tone is:
- *a. dominance of the parasympathetic
 - dominance of the sympathetic
 - O₂ threshold
 - kinesthesia
62. Which of the following studies show a "cause and effect" to C.H.D.?
- Isrnel Kibutz
 - Irish
 - Framingham, Mass.
 - *d. none of the above
63. In response to the Lipid Deposit Theory, an individual:
- should have a blood fat level test every year
 - should reduce animal fat in the diet below that of the average American
 - should engage in moderate exercise after fatty meals
 - *d. all of the above are true
64. Which relates most to the "Loafer's Heart" theory?
- *a. sympathetic dominance
 - lipid deposit
 - stroke volume
 - hypertension

65. The theories of heart disease all share in common:
- *a. probable relationship to exercise
 - b. probable relationship to amount of cholesterol in the diet
 - c. assurance of preventing all heart attacks
 - d. discontinued exercise programs for the subject
66. Which is not an important variable for threshold of training?
- a. frequency
 - *b. efficiency
 - c. intensity
 - d. duration
67. What was the significance of the Irish heart study?
- a. showed high starch diet to be dangerous
 - b. showed cross country running to be best exercise
 - c. showed poor people have less heart disease
 - *d. showed exercise to reduce cholesterol
68. According to the heart association, which is the greatest C.H.D. risk factor?
- a. fatness
 - b. inactivity
 - *c. smoking
 - d. age
69. To be effective, exercise should be taken regularly not less than:
- a. 2 times per week
 - *b. 3 times per week
 - c. 4 times per week
 - d. 5 times per week
70. Which program was developed by the President's Council on Physical Fitness?
- *a. adult fitness program
 - b. rhythmical endurance circle program
 - c. XBX
 - d. aerobics
71. Which program of exercise is based on a 30-point scale?
- a. adult fitness program
 - b. rhythmical endurance circle program
 - c. XBX
 - *d. aerobics
72. Which one of the following is not a risk factor to C.H.D.?
- a. smoking
 - b. heredity
 - c. sex and age
 - *d. "athlete's heart"

73. Col. Kenneth Cooper, M.D., suggests that physical fitness is best developed in activities that can be continued for a long time period without building up:
- *a. oxygen debt
 - b. oxygen pump count
 - c. XBX or SBX debt
 - d. lipid or fibrion count
74. Which is not most important in determining the amount of exercise necessary to be fit?
- a. frequency
 - b. intensity
 - c. duration
 - *d. body weight
75. What percent of maximal heart rate should be used to meet cardiovascular threshold of training?
- a. 45%
 - *b. 60%
 - c. 75%
 - d. 90%
76. Which of the following programs will serve as excellent programs for weight control if dietary restrictions accompany the program?
- a. adult fitness
 - b. XBX-SBX
 - c. aerobics
 - *d. all of the above
77. Which is a basic exercise guideline?
- a. start at a high level of intensity
 - *b. exercise with a partner
 - c. do ballistic stretching first
 - d. hold your breath during calisthenics
78. Which is retained best with aging?
- *a. skill
 - b. endurance
 - c. strength
 - d. power
79. General Motor Ability is:
- *a. skill I.Q.
 - b. an auto company
 - c. feedback
 - d. O₂ composition
80. Kinesthetic sense is:
- *a. movement sense from muscles, tendons, and joints
 - b. aerobic sense
 - c. ischemia capacity
 - d. caloric knowledge

81. When a skill becomes a "habit" it is called:
- a. kinesthesia
 - *b. overlearning
 - c. paralysis
 - d. regression
82. Too much feedback can produce:
- a. hyper-extension
 - b. oxygen debt
 - *c. Analysis Paralysis
 - d. aerobics
83. New skill learning may cause a _____ in performance.
- a. progression
 - *b. regression
 - c. residual
 - d. resident
84. _____ refers to combined use of the nervous and muscle systems--
a physical skill.
- a. analysis
 - b. regression
 - c. ischemia
 - *d. motor
85. Strong abdominal muscles prevent:
- a. stretch reflex
 - b. navelitis
 - *c. back pain
 - d. prenatal anemia
86. Which of the following is an athletic-type build?
- a. ectomorph
 - *b. mesomorph
 - c. acromorph
 - d. endomorph
87. Which is the major reason for lordosis?
- *a. weak abdominal muscles
 - b. short hamstring muscles
 - c. weak low back muscles
 - d. weak gluteal muscles
88. Which is most true?
- a. Women should not do chin-ups.
 - b. Women who train with weights will become musclebound.
 - c. Women who exercise build mostly overdeveloped legs.
 - *d. Women should not lift more than a third of their body weight.

89. Local tenderness, especially in the lower back, hips, neck, and shoulders is referred to as:
- a. lumbago
 - *b. fibrositis
 - c. erector spinae
 - d. sacroiliac
90. Kinesthesia is:
- a. back and leg power
 - *b. muscle sense
 - c. speed
 - d. a back muscle
91. Which is the best abdominal strength exercise?
- a. straight leg sit up
 - b. double leg lift
 - *c. bent knee sit up
 - d. burpies
92. A severe defect affecting bony structures cannot be corrected by exercise and habits:
- *a. structural defect
 - b. functional defect
 - c. Adam's defect
 - d. rotatory defect
93. Type A personality is one who is:
- a. susceptible to obesity
 - b. athletic personality with muscular physique
 - *c. stress personality
 - d. personality resistance to heart disease
94. In this method of relaxation one must recognize how a tense muscle feels before one can voluntarily release the tension.
- a. imagery
 - b. Schade method
 - c. Arrington's Progressive
 - *d. Jacobson's Progressive
95. The wear and tear on the body:
- a. adaptation
 - b. alarm reaction
 - c. exhaustion stage
 - *d. stress
96. Continuing failure to adapt to stress:
- *a. chronic fatigue
 - b. hypertension
 - c. hypotension
 - d. residual

97. The General Adaptation Syndrome does not include which of the following:
- a. alarm reaction
 - b. stage of resistance
 - c. stage of exhaustion
 - *d. alarm diversion
98. Which of the following is a true statement?
- *a. physical exercise may be a stressor
 - b. emotions will not provoke stress
 - c. individuals react the same to stressors
 - d. diseases are not caused by stress
99. Which is not a true statement?
- a. tension is a psychophysical phenomenon
 - b. fatigue and hypertension are closely related
 - *c. excessive tension cannot be relieved by planning
 - d. conscious relaxation is one of the most satisfactory methods of releasing tension.
100. Which is not one of the "Three R's" of relaxation?
- a. recognize tension
 - b. reduce mental activity
 - *c. reduce blood volume
 - d. reduce respiration

APPENDIX G

8:30 LECTURE AND TUTORIAL RAW SCORES

8:30 LECTURE AND TUTORIAL RAW SCORES

LECTURE			TUTORIAL		
<u>Student Number</u>	<u>Pre-Test</u>	<u>Post-Test</u>	<u>Student Number</u>	<u>Pre-Test</u>	<u>Post-Test</u>
1	30	65	16	54	80
2	48	86	17	48	75
3	39	67	18	55	83
4	35	47	19	56	77
5	36	73	20	36	75
6	54	80	21	46	80
7	50	83	22	47	76
8	51	83	23	34	65
9	44	71	24	39	66
10	35	60	25	49	77
11	39	85	26	41	51
12	42	81	27	37	70
13	31	77	28	41	74
14	36	68	29	48	79
15	39	71	30	35	57
			31	50	86
	N = 15			N = 16	

APPENDIX H

10:30 LECTURE AND TUTORIAL RAW SCORES

10:30 LECTURE AND TUTORIAL RAW SCORES

LECTURE			TUTORIAL		
<u>Student Number</u>	<u>Pre-Test</u>	<u>Post-Test</u>	<u>Student Number</u>	<u>Pre-Test</u>	<u>Post-Test</u>
32	43	78	53	51	87
33	37	79	54	45	76
34	40	64	55	40	68
35	23	60	56	41	81
36	46	75	57	42	77
37	40	71	58	53	83
38	31	72	59	41	62
39	28	46	60	34	73
40	38	74	61	45	65
41	28	54	62	43	74
42	35	70	63	43	74
43	42	73	64	39	73
44	44	72	65	35	61
45	37	64	66	37	81
46	57	85	67	40	81
47	58	88	68	39	50
48	44	77	69	34	54
49	52	89	70	43	67
50	49	76	71	48	76
51	34	61			
52	63	81			
	N = 21			N = 19	

APPENDIX I

1:30 LECTURE AND TUTORIAL RAW SCORES

1:30 LECTURE AND TUTORIAL RAW SCORES

LECTURE			TUTORIAL		
<u>Student Number</u>	<u>Pre-Test</u>	<u>Post-Test</u>	<u>Student Number</u>	<u>Pre-Test</u>	<u>Post-Test</u>
72	33	69	85	45	86
73	51	79	86	42	68
74	38	84	87	52	88
75	38	65	88	45	70
76	54	83	89	50	73
77	40	85	90	42	65
78	34	75	91	58	83
79	52	81	92	24	71
80	47	79	93	46	64
81	40	72	94	35	72
82	38	86	95	38	73
83	44	71	96	42	82
84	50	78	97	35	64
			98	29	39
			99	41	77
	N = 13			N = 15	

VITA 2

David Robert Laurie Jr.

Candidate for the Degree of

Doctor of Education

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Education: Graduated from Atchison High School, Atchison, Kansas, 1959; received Bachelor of Science degree from Kansas State University, May, 1963, with a major in Health and Physical Education; received the Master of Science degree in Health and Physical Education from Kansas State University, Manhattan, Kansas, in 1966; completed requirements for Doctor of Education degree in July, 1974, with a major in Higher Education and a specialization in Health, Physical Education, and Recreation.

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