A Comparison of Two Instructional Methods in Teaching an Introductory Course in Health

Charlotte Mitchell
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Charlotte D.

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A COMPARISON OF TWO INSTRUCTIONAL METHODS
IN TEACHING AN INTRODUCTORY COURSE IN HEALTH

A Thesis
Presented to
the Faculty of the Department of Health and Safety
Western Kentucky University
Bowling Green, Kentucky

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

by
Charlotte D. Mitchell
December 1978
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A COMPARISON OF TWO INSTRUCTIONAL METHODS
IN TEACHING AN INTRODUCTORY COURSE IN HEALTH

Recommended December 13, 1978
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Bruce Goodrow
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Approved January 9, 1979
(Date)

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TABLE 11. Frequency Distribution of Pre-Post Difference of the Kilander-Leach Health Knowledge Test for Experimental and Control Populations........... 96
The purpose of this research was to determine the effectiveness of the independent study method of instruction in promoting health knowledge and health attitude change. The experimental method was compared to the traditional classroom model of instruction.

A random sample of ten subjects was taken for the experimental group and matched control subjects were then selected. Control subjects were chosen based on the demographic variables of age, race, sex, academic classification and grade point average.

A pretest-posttest design using two standardized instruments was employed to measure the health knowledge gain and health attitude change. Data was statistically analyzed by use of a two-tailed T-test.

Findings revealed no significant difference between the independent study model of instruction and the traditional instructional model regarding health knowledge gain or attitude change.

Conclusions were made regarding the findings and recommendations were offered for future research in this area.
CHAPTER I

INTRODUCTION

Health educators have long been concerned with the problem of selecting an instructional approach most favorable to the achievement and retention of predetermined objectives such as knowledge,\(^1,2\) attitudes,\(^3,4\) and behavior.\(^5,6\) A measurable change in health knowledge, attitudes and behavior should occur upon completion of a successful health education program and these individual modifications should remain with the student, causing an improvement in health


lifestyle. With the emergence of health behavior as a new arena for research, health concepts and the development of health attitudes have gained increasing importance.

This growing awareness of the importance of health education has led to extensive research in the area of educational methods. Kreuter and Green identified three legitimate and appropriate needs in the area of health education research: 7

1. the need to refine and improve teaching methods;
2. the need to show other professionals that our educational activities are legitimate; and
3. the need to prove that health education in schools renders measurable gains. 8

The practice of health education is not a recent phenomenon, although many different instructional approaches to health education are being employed. In the process of choosing the best instructional method of health education, the initial step is to determine the purposes of health education. Frequently cited objectives of health education are:

1. to contribute to self-fulfillment of individuals and promote their well-being as individuals;


8 Kreuter and Green, p. 228.
2. to enhance the ability of people to cope effectively with health promotion, health maintenance, and illness control;

3. to reduce undesired risks of disease and illness;

4. to help people maintain personal and civil integrity while receiving health care;

5. to create more active individual and community participation in the health system by increasing a) personal competence in self-care, and b) social skills in working within the formal health system.9

People have the right and the responsibility to determine their own health status through adequate knowledge and development of positive health attitudes which lead to appropriate behavior.10 According to the objectives stated above, it is the responsibility of health educators to expedite these knowledge and attitude changes. Health is more than wellness or the absence of disease. A well person can become healthier through his own efforts. However, the attainment of health knowledge and the development of positive health attitudes must occur before behavior changes can be initiated. The goal of health education is to promote this acquisition of health knowledge in order to stimulate the development of positive health attitudes.

9Lowell S. Levin, "Health Education: Moving to Center Stage," Connecticut Medicine, XXXIX, No. 10 (1975), 631-632.

Since health knowledge and health attitudes play such an important part in the quest for optimal health, it is essential that research be conducted to develop and evaluate more effective methods of instruction aimed at achieving these goals.\textsuperscript{11,12} One instructional method which has grown in popularity during recent years is the method of self-directed study.

Although numerous comparison studies involving students have been conducted, further research comparing different instructional methods is still needed.\textsuperscript{13} The goal of such research is to establish the particular strengths of each approach regarding different ages and learning abilities as well as application of the various instructional methods to the subject material being taught.\textsuperscript{14} In 1971, W. H. Allen noted a need for more intensive research efforts in the belief that this research would eventually

\begin{itemize}
\item \textsuperscript{13}Ray J. Simpson, "Teaching: By Personal Appearance or by Print?" \textit{Improving College Teaching}, XXIII (Summer, 1975), 185.
\end{itemize}
enable one to predict how well students with different learning abilities would perform under various instructional models.  

There is little direct evidence comparing the knowledge gain of students in either behavioral teaching (a variation of the Keller method as described by Johnston and Pennypacker 16) or traditional teaching methods. However, it seems to be well established that such methods of instruction are effective in achieving the objectives of the experimental courses, as set by the instructor. 17

The effectiveness of a Keller system for achievement of specified educational objectives in health education has not yet been determined. In 1970, the study by Sheppard and MacDermot showed that students performed better on both objective and essay questions when taught by the Keller method rather than a conventional study group. 18 However,


this study considered only a small component of the broader area of educational measurement.

Many problems regarding the Keller format remain, the most pressing issues being those related to determining the effectiveness of the Keller method when compared to more traditional lecture-discussion methods, in quality of student performance.19 The purpose of this study was to compare these two methods for effectiveness in promoting successful student gains in health knowledge and influencing health attitude change.

II. STATEMENT OF THE PROBLEM

The research problem in this study was to evaluate the effectiveness of an independent study model on health knowledge and health attitudes. This experimental model was compared to a traditional classroom instructional model to determine the effectiveness in promoting health knowledge and in changing health attitudes.

III. HYPOTHESIS

The research hypothesis of this study was that health knowledge and health attitudes would be modified equally in a classroom health instruction approach and the

independent study instruction approach. The following null hypotheses were tested:

$H_0^1$ The mean score for health knowledge for the lecture model of Personal Health 100 will not significantly differ from the mean health knowledge score in the independent study model.

$H_0^2$ The mean score for health attitude changes for the lecture model of Personal Health 100 will not significantly differ from the mean attitude score in the independent study model.

IV. BASIC ASSUMPTIONS

The following basic assumptions were considered necessary for this study:

1. The respondents will answer the questionnaires accurately and to the best of their ability on both the pretests and the posttests.

2. The students will complete all work assigned to them in each of the teaching methods to the best of their ability.

V. LIMITATIONS

1. Both experimental and control students used in this study were enrolled in the Personal Health 100 course offered by the Department of Health and Safety at Western Kentucky University.
2. Only those students enrolled in Personal Health 100 during the Fall Semester of 1978 were used in this study.

VI. DELIMITATIONS

1. Only scores from students who completed the traditional course or the independent study were utilized in the data analysis.

2. Health knowledge was determined by scoring the Kilander-Leach Health Knowledge Test.

3. Health attitude was measured by students completing the Olsen's Health Attitude Inventory.

VIII. DEFINITIONS AND INTERPRETATIONS

1. Health knowledge - That inferred capability which makes possible the successful completion of the Kilander-Leach Health Knowledge Test. 20

2. Health attitude - A relatively stable organization of beliefs leading the individual to perceive personal health and health related problems in certain ways. This in turn causes the subject to respond to the Olsen's Health Attitude Inventory in some preferential manner.

3. Attitude change - A change in inclination or perception, the change being either in the organization or the content of the beliefs which make up the attitude.

4. **Personal Health 100** - An introductory course emphasizing the personal health problems and factors influencing behavior related to health.\(^{21}\)

5. **Independent study** - A course design which allows the student to progress at his own rate and without the direct instruction of a classroom-teacher oriented approach. This unit was comprised of ten separate sub-units which the student was expected to complete within the sixteen week semester period.

6. **Traditional approach** - The teacher-centered presentation of subject matter through the traditional textbook-lecture technique; the more or less continuous oral presentation of a prescribed body of health information.\(^{22}\)

7. **Kilander-Leach Health Knowledge Test** - a standardized instrument employed to determine the health knowledge of the students.

8. **Olsen's Health Attitude Inventory** - a standardized test used to measure the health attitude changes of the respondents.

9. **Effectiveness** - The capability to produce a

\(^{21}\)Western Kentucky University Bulletin, Western Kentucky University, Bowling Green, Kentucky, (1978), 117.

desired result. In this study, the term was in relation to the capability of the established teaching methods to promote health knowledge gain and health attitude changes.

10. **Control group** - The sample of students enrolled in the traditional instructional model.

11. **Experimental group** - The students registered in the independent study instructional model.

VIII. ORGANIZATION OF THE STUDY

This study is divided into five chapters. Chapter I includes an introduction, statement of the problem, hypotheses, and definitions of terms and limitations. A review of related literature is presented in Chapter II. Chapter III presents an explanation of the methods and procedures used to complete the study. Chapter IV involves the analysis and interpretation of the data collected in the study. Chapter V consists of a summary, conclusions, and recommendations for future research.
CHAPTER II

REVIEW OF RELATED LITERATURE

The following literature review has been divided into three specific areas. The first component is concerned with the goals and purposes of health education and ways in which these goals are accomplished. The second part deals more specifically with research in evaluation of various instructional methods. The final section of this chapter reviews previous studies conducted specifically in the field of health education.

I. GOALS AND PURPOSES OF HEALTH EDUCATION

Individuals have many health problems and decisions to make; decisions which must be based on their own health knowledge and attitudes. However, these individuals are forming decisions about their health lifestyles based upon the ideas of adults and peer groups.¹

In order to successfully motivate these students toward a more favorable outlook on health, health educators

must view different approaches to health education and focus on not only the knowledge aspect of learning, but also on the affective and action domains of health.² The impersonal, scientific approach to health which was traditionally used in health education turns many students off because they can't seem to apply only factual knowledge to their own personal lives.

Hoyman developed nine suggestions for health instructors, three of which dealt specifically with changing student behavior.³

1. **Don't indoctrinate, educate.** The instructor may encourage decision making on the part of the student.

2. **Focus on relevant subjects.** Young people value a positive sense of self-identity and personal worth, and they view health in these terms.

3. **Don't focus on presenting facts, focus on changing behavior.** Health knowledge and information are not adequate to the entirety of health education since both rational and irrational factors are involved in health decision making. The task of health education is to help students develop a working technique for reaching goals that are personally


satisfying and socially acceptable.\textsuperscript{4}

The need of health education is not to merely increase man's longitivity, but to promote the development of healthier living.\textsuperscript{5} Health education must be concerned with promoting sound healthful living as well as reducing behavior-induced disease. The objective of health education, as adopted by Jones and Grahame, was that "health education should be concerned with establishing or inducing changes in personal and group attitudes and behavior that promote healthier living."\textsuperscript{6} "Health" is the goal - "education" is only the process.\textsuperscript{7}

In a paper presented as the presidential address at the twenty-fifth annual meeting of the Society for Public Health Education (S.O.P.H.E.), several points were discussed. First, the U. S. Office of Education reported results from a University of Texas study indicating that over 20 percent of the U. S. population is functionally

\textsuperscript{4}Hoyman, "Health Ethics and Relevant Issues," pp. 523-524.

\textsuperscript{5}Howard S. Hoyman, "Human Ecology and Health Education II," \textit{The Journal of School Health}, XLI (December, 1971), 542.


\textsuperscript{7}Hoyman, "Human Ecology and Health Education II," p. 542.
incompetent to maintain good health.\(^8\) This is in spite of efforts in education to help people help themselves.

A second point was that health education is a necessary component of the overall health care delivery system. On the governmental level, progress has been made in promoting health education through legislation such as the National Health Planning and Resource Development Act of 1974, the Bureau of Health Education in Atlanta, and a new National Center for Health Education.\(^9\)

Health education is currently expanding in subject matter and in research to include aspects of health which are more relevant to the student's lifestyles. Chronic disorders, acute illness, mental health, pregnancy and family planning, environmental health, and preventive health practices are some of the topics being taught. In recent evaluations of health education, attention has been given to the outcomes of health education.\(^10\)

Crase and Hamrick identified one of the objectives of health education as being the development of sound principles of consumerism. Consumer education is essential to any approach to healthful living, since there are so many

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8. Beverly G. Ware, "Directions for Health Education: New Spokes in the Wheel... Or a New Wheel," Health Education Monographs, IV (Fall, 1976), 247.

9. Ware, p. 247.

10. Levin, p. 634.
fraudulent health articles on the market today. The entire concept of health education must expand to include topics relevant to the lives of those individuals who the educator attempts to reach.\textsuperscript{11} According to these authors, such topics as death education, health "risk-taking," and developing interpersonal and intercultural relations should be included in the curriculum of health education.

In 1971, Hoyman set up guidelines as to what health science curricula should include. A major point was that health education should be developed so as to help insure a spiral learning progression from elementary to advanced levels, aimed at improving knowledge and skills, changing attitudes and beliefs, developing sound health practices, and organized to avoid boring unplanned repetition of topics.\textsuperscript{12}

Kreuter developed a three stage teaching model for health educators based on the idea that personal responsibility is of special importance to the educator, particularly since the majority of health problems which are currently health threats in the U.S. appear to be results of our


\textsuperscript{12}Hoyman, "Human Ecology and Health Education II," p. 542.
own behavioral choices.\textsuperscript{13} McAlister et al. gave support to this theory of behavior related health problems by stating that many cases of death and disability from cardiovascular disease can be prevented by early detection and modification of behavioral "risk-factors."\textsuperscript{14}

Kreuter's three stage model for health educators included:

1. Conceptualizing health - The instructor should define health for himself and guide the students to an understanding of what health means to them. Students should first understand that most major health problems are preventable and second, have a working definition of health.

2. Generating the data - The student must evaluate his own health and then decide what improvements could be made through his own behavior.

3. Personal commitment and the change process - It is necessary that the student be willing to make these changes in his health behavior before the instructor can


begin various techniques to facilitate these changes.\textsuperscript{15}

Kreuter explained that if the student doesn't want to change his behavior, then there is little hope that he will improve his health lifestyle. The purpose of health education is to facilitate growth and change - not to impose the changes on the students. The attitudes of the students must change before health knowledge can be implemented into his decision making.\textsuperscript{16}

Professional health educators, whether working in the school, the community, hospitals, or the home, are often required to transfer information, influence attitudes and, in some instances, change behavior patterns. Typical oral communication as in a conventional lecture method of instruction is frequently inefficient and ineffective as a technique for accomplishing these requirements.\textsuperscript{17}

Health education is currently characterized by ignorance, disinterest, and underprovision, which creates a vicious circle. Schools are failing to provide effective health education because of (1) lack of trained personnel,  

\textsuperscript{15}Kreuter, pp. 543-544.
\textsuperscript{16}Kreuter, pp. 543-544.
\textsuperscript{17}Vilma T. Falck, "Involvement for Learning in Health Programs," The Journal of School Health, XLVII (March, 1978), 168.
(2) inadequate resources, and (3) absence of active research needed to induce changes in health education.\textsuperscript{18}

School health education has great potential for students because they can learn skills in health care which may result in helping them avoid the apathy and low competence of our adult population regarding health.\textsuperscript{19} The method of instruction for health education programs affects the amount of benefit gained from the program. Crase and Hamrick stated that, "We may be ineffective with our traditional delivery systems at the collegiate level and will need to adopt more nontraditional approaches in order to effect significant change among young people."\textsuperscript{20}

In evaluation of health education, interest has been focused on two separate outcomes. The first was knowledge gain and attitude change, and the second was actual behavior changes.\textsuperscript{21}

Various methods of instruction are being innovated in health education, one of these methods being self-directed study. With the development and growing interest in such programs, attention was focused on "productive

\textsuperscript{18} Jones and Grahame, p. 279.
\textsuperscript{19} Levin, p. 633.
\textsuperscript{20} Crase and Hamrick, p. 471.
\textsuperscript{21} Levin, p. 633.
learning," the kind of change in human behavior which allows the individual to develop skills in everyday healthful living rather than just acquiring adequate knowledge necessary to successfully complete the health education course.22

Halloran employed a definition of attitude as being "a state of readiness leading the individual to perceive things and people around him in certain ways; that is to be more ready with certain categories and interpretations than with others."23 Furthermore, he pointed out that attitudes are not innate. They are learned, developed, and are organized through experience. These attitudes, although relatively stable, are modifiable and subject to change.24

Halloran developed the following conclusions regarding attitudes:

1. It is possible to change attitudes.
2. In order to produce change, a suggestion for change must be received and accepted.
3. Reception and acceptance are more likely to occur where the suggestion meets existing personality needs or drives.
4. The suggestion is more likely to be accepted if
   (a) it is in harmony with valued group

22Gagne', p. 355.
norms and loyalties,
(b) the source of the message is perceived as trustworthy or expert,
(c) the message follows certain rules of 'rhetoric' regarding order of presentation, organization of content, nature of appeal, etc.

5. A suggestion carried by mass media plus face-to-face reinforcement is more likely to be accepted than a suggestion carried by either one of these alone, other things being equal.

6. Change in attitude is more likely to occur if the suggestion is accompanied by change in other factors underlying belief and attitude.25

These conclusions were interpreted to say that instructional methods are most likely to be effective and attitudes most likely to change (a) when the material relevant to the student is presented in such a way and at such a time that it is reinforced by other events in the student's environment, (b) when the change is given social support, and (c) where alternative modes of action and possible future problems are indicated by the instructor.26

There is a need to evaluate school health education not only for professional growth and advancement, but also for continuance of the health education program. In evaluating health education programs, different criteria of

26 Halloran, p. 59.
judgement must be set for various programs. What may be an appropriate measure of effectiveness in one program may not be valid for another. Kreuter and Green acknowledged that to measure immediate behavior change as a method of evaluating health education would be "technically and politically naive" since health education is aimed at motivating behavior changes, not forcing changes.\footnote{Kreuter and Green, p. 231.}

II. IDENTIFICATION AND EVALUATION OF INSTRUCTIONAL METHODS

Fred S. Keller developed a system of independent study designed with certain features which distinguished it from conventional teaching procedures. These characteristics were:

1. The go-at-your-own-pace feature, which permits a student to move through the course at a speed commensurate with his ability and other demands upon his time.

2. The unit-perfection requirement for advance, which lets the student go ahead to new material only after demonstrating mastery of that which preceded.

3. The use of lectures and demonstrations as vehicles of motivation, rather than sources of critical information.

4. The related stress upon the written word in teacher-student communication; and, finally:

5. The use of proctors, which permits repeated
testing, immediate scoring, almost unavoidable tutoring, and a marked enhancement of the personal-social aspect of the educational process.\textsuperscript{28}

Especially important in the Keller method is that all students, no matter what the social, economic, cultural, or ethnic background, progress through the course by intellectual relationships with the staff. Also, a student handicapped by lonesomeness, poor schooling, or other problems, is assured of at least a moderate amount of individualized instruction.\textsuperscript{29}

As a result of this method of independent study, the grade distribution shows a greater percentage of A's than any other score. Grades of C and D were due to the student's failure to complete all the course units before taking the final exam. Failing grades were given to students who did not attend the class or did not take advantage of the opportunity to drop the course from their enrollment records.\textsuperscript{30}

An advantage to the Keller model was that it did not require equipment and supplies that were not readily available to almost every teacher. Audiovisual equipment, tape recorders, and computers were easily utilized in the

\textsuperscript{28}F.S. Keller, "Good-Bye, Teacher..." Journal of Applied Behavior Analysis, I (Spring, 1968), 83.

\textsuperscript{29}Keller, p. 86.

\textsuperscript{30}Keller, p. 86.
instructional modes. However, Keller advised against excessive automation in individualized instruction, especially for young students.\textsuperscript{31}

In 1970, Myers evaluated the operant learning principles as applied to teaching introductory statistics. This method was considered a partial replication of the Keller method of instruction. Certain departures from the original idea of independent study were made in an attempt to lower the number of students failing to complete the course, the major flaw in Keller's approach.\textsuperscript{32}

The main purpose of the experimental statistics course was to arrange the conditions of learning so that students with varied backgrounds and abilities could master the course.\textsuperscript{33}

Results based on performance and attitudinal data indicated that neither student grade point average (GPA) nor the number of days required by the student to complete the course had any significant effect on performance within the course. In regard to student attitude, the study revealed that students who had the most exam errors rated the class more favorable than those students who

\textsuperscript{31}Keller, p. 87.


\textsuperscript{33}Myers, p. 191.
scored high on the unit exams.  

Ferster conducted a study evaluating operant learning in an introductory psychology college course. The experimental section of instruction was similar to the Keller method of instruction in that the students could progress at their own pace. The primary procedure of the course was the student interview, a deviation from the Keller model. Each student was required to read a part of the text and then schedule an "interview" with another student who had previously completed that part of the readings. These sessions, of which each student must conduct an equal number of speaking and listening interviews, were designed to review the participants before each unit exam. After mastery of all exams was demonstrated, a comprehensive final was scheduled. Grades for the entire course were based upon the amount of time devoted to the course study.  

Three advantages of the individualized instruction program were summarized from this study.

1. The operant learning procedure allowed the student to become an active participant rather than just a

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34 Myers, p. 191.

35 C.B. Ferster, "Individualized Instruction in a Large Introductory Psychology College Course," The Psychological Record, XVIII (1968), 521.
2. The instructor in the individualized instruction course is reactive to the student's achievement.

3. The students in the personalized course are required to master each unit before they are allowed to progress to the next unit, insuring mastery of the course.\(^{36}\)

The study by Born and Herbert gave further support to the development of individualized instruction. During an eight week summer session, 161 students enrolled in an introductory psychology course taught by a modified Keller procedure. Students were allowed to progress throughout the course at their own pace, although perfect exam scores were necessary to progress through the consecutive units. Each exam covered only the text and written material. Extra lectures, movies, and discussions were scheduled for the student's benefit. Grades for the personalized course were based upon the exams (worth a total of 70 points) and the 30 point final. The final was administered on a one-trial basis. A total of 95 points were required for a grade of A.\(^{37}\)

Of the 143 students who completed the course, the majority did so in the longest possible time. Grades

\(^{36}\)Ferster, p. 531-532.

resulted in a skewed curve toward the A level. Student evaluation of the course indicated that complaints were generally directed toward the amount of required work. However, based on the average study time of each student, the individualized course required no more, and perhaps less, time than would a lecture class. The majority of the students stated that they would recommend the course to be taken by other students. The respondents also gave high ratings to the course proctors. 38

The purpose of the study by Schaffer and Purohit was to determine the effects of different instructional strategies upon attitude and cognitive achievement of nursing students. The three methods compared were the traditional lecture method, the black and white television instruction, and the color television instruction via the dial access system. The variables of the study were: (a) background information of student's exposure to instructional media, (b) student's perceptions about the three instructional strategies, (c) student's attitude differences between color and black and white televised instruction, and (d) student's educational objectives and philosophies. 39

38 Born and Herbert, pp. 10-11.
39 Schaffer and Purohit, p. 360.
Results of the study were as follows:

1. Background analysis - This was developed by use of a questionnaire. The researchers found that the majority of the students had had extensive exposure to the various forms of instructional media, but only limited exposure to independent study methods utilizing the media.

2. Philosophies of students - Four statements developed by Morstain were employed to illustrate student philosophies. The researchers concluded that there was "no strong commitment by the majority of the students to any particular instructional strategy or educational objective."

3. Attitude difference between color and black and white televised instruction - Use of a questionnaire showed overall preference for color television as it was considered to be more interesting and of more instructional value.

4. Attitude measure of student's perceptions of instructional strategies - Results of the pre- and posttest questionnaire showed that the dial access groups felt that the color method covered less material than did either the lecture or the black and white groups.

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41 Schaffer and Purohit, p. 361-362.
5. Cognitive achievement - Use of the pre- and posttests indicated a difference in the amount of cognitive learning under the two instructors, probably due to different degrees of difficulty in teachers.  

An evaluation of course methods presented by Leton compared the relative efficacy of three different methods of college teaching: lecture, case-centered, and group-centered. The study did not attempt to contrast the different groups, but rather to evaluate each group.

Results of this study showed no significant difference between the groups on achievement (as determined by the final exam scores) or in effectiveness for changing attitudes (measured by the Minnesota Teachers Attitude Inventory and the Shoben's Parent Attitude Survey). However, a significant relationship was found to exist between course achievement and attitudinal change.

A study conducted in 1968 compared four teaching methods aimed at the goals of (1) acquiring facts; (2) gaining understanding of principles, generalization, and concepts; and (3) learning procedures in the most effective

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42 Schaffer and Purohit, pp. 361-362.
44 Leton, pp. 118-119.
and efficient way. One hundred and forty-eight physicians were randomly divided into either programmed text, standard textbook, lecture-demonstration, or lecture-workshop strategies. A posttest measured factual content by practical application of acquired knowledge. The test skill was chosen because it was generally unfamiliar to the doctors and it could be taught to the subjects in about three hours. 45  

Neither analysis of variance nor analysis of covariance of the posttest results showed any significant mean difference in learning. Additional data showed the time spent by the respondents to be highest in the lecture-demonstration technique and lowest in the textbook instruction. The only advantage to the textbook or the programmed learning methods was that it took less time and could be completed at the physicians own pace. 46  

In a comparison of traditional and behavioral college teaching methods for a course in Human Growth and Development, Alba and Pennypacker found that the behavioral group improved significantly more than the traditional group on multiple choice or fill-in exam questions. Data gained from this study further revealed that

46 Manning, Abrahamson, and Dennis, pp. 357-358.
(a) generalization results from the behavioral procedures; (b) differences were not affected by test validity since the researchers employed the same questions for both the experimental and control test instruments; (c) the experimental instructional method works with various courses; and (d) there was no discrepancy in sampling since the research design involved pre- and posttesting of the students.47

In 1977, Young conducted a cost and effectiveness analysis of the behavioral objective lecture approach and the individualized self-paced approach to teaching Principles of Economics. Using a non-randomized control group, the following conclusions were formed:48

1. students in general, gained more understanding of economics in the lecture class;

2. students who scored high on the American College Test (ACT) and who had high grade point averages (GPA) did well in both classes, but those students with an ACT score of above 28 did especially well in the self-paced class:

3. Students with GPAs of less than 1.5 did best in the

47 Alba and Pennypacker, p. 123.

independent study model;

4. the gain in understanding and grades is directly related to GPA;

5. students who averaged at least 50 hours of study did best in the self-directed approach whereas those individuals who devoted less than 50 hours to study did best in the lecture model; and

6. the per student costs were greater in the lecture approach but the cost effectiveness ratio was in favor of the lecture approach.\textsuperscript{49}

Born, Gledhill, and Davis conducted a study which compared four models of instruction with major emphasis on the comparison of lecture-discussion and Keller models of learning. Students were ranked in the different classes according to grade point averages. Results of this study revealed that the students in the Keller course performed better than the lecture students on exams, especially regarding essay questions. Results of a gross analysis of the rotation section (in which students were subjected to lecture, Keller, and the modified Keller models of instruction) indicated that the Keller model had its greatest impact on students with "average" to "poor" academic records.\textsuperscript{50}

\textsuperscript{49}Young, p. 5606A.

\textsuperscript{50}Born, Gledhill, and Davis, p. 33.
In a study comparing lecture and discussion procedures in three college courses, Ruja concluded that the lecture method was most effective in promoting cognitive learning while the discussion model was superior in promoting class acquaintances. In the philosophy class, the discussion group students rated the instructor more favorably than did the lecture students.\footnote{51}

In similar studies involving psychology students,\footnote{52,53,54,55} results indicated that students in the Keller model of instruction not only rated the instructor and the course more favorably than did the lecture students, but also, the Keller students performed better on the comprehensive final exam.

A study involving students in Educational Psychology compared self-directed study and lecture courses for

\footnote{51}{Harry Ruja, "Outcomes of Lecture and Discussion Procedures in Three College Courses," \textit{The Journal of Experimental Education}, XXII (June, 1954), 393.}

\footnote{52}{D.R. Witters and G.W. Kent, "Teaching Without Lecturing: Evidence in the Case for Individualized Instruction," \textit{The Psychological Record}, XXII (1972), 169-175.}

\footnote{53}{Sheppard and MacDermot, pp. 5-11.}


\footnote{55}{C.J. Morris and G. Kimbrell, "Performance and Attitudinal Effects of the Keller Method in an Introductory Psychology Course," \textit{The Psychological Record}, XXII (1972), 523-530.}
achievement, retention, and curiosity. Data revealed no significant differences in either achievement (as measured by the final exam and grades) or in knowledge retention, although the students in the self-directed study did perform slightly better on a posttest administered ten months after completion of the course. The self-directed study did prove to encourage curiosity more than the lecture method by a low level of significance.\textsuperscript{56}

In a study measuring the acquisition, retention, and transference of knowledge in an individualized college physics course, researchers compared the continuous progress plan (CP) with the traditional lecture model of instruction (C). The CP students were tested over tapes and text assignments with a unit mastery requirement for progression through the course. The C students attended two lectures and two quiz sessions each week which they were tested over along with text requirements. Both groups were given the same final exam and then enrolled in a lecture course the following semester.\textsuperscript{57}

Analysis of variance indicated that the continuous progress section was significantly superior to the lecture group in (a) performance on the final exam, (b) transfer of

\textsuperscript{56}Moore, Hauck, and Gagne', pp. 335-340.
\textsuperscript{57}Moore, Hauck, and Gagne', pp. 337-338.
knowledge between semester courses, and (c) retention of knowledge as indicated by a retention exam administered 12-15 months after completion of the first semester course. 58

A study by Watson compared the effectiveness of the case-study and lecture methods for producing two types of learning; knowledge and understanding, and ability to apply various management topics. Results suggested that both methods were effective in teaching knowledge but the case-study method was significantly more effective in teaching application. The case study method also showed favorable student reaction toward the professor and student perception of the learning climate. 59

Kapoor conducted a study to compare the learning outcomes from an illustrated lecture-discussion method (the control group) with the decision-making problem-solving method (the experimental group) to determine if a significant difference existed between mean achievement scores in a collegiate level Introduction to Business course. The three researcher-prepared instruments provided the data used to categorize the students. Publisher-prepared test questions were used in the pretest.

58 Moore, Hauck, and Gagne', pp. 337-338.

posttest, and four achievement exams.  

Results showed no significant differences except in the opinions and attitudes toward advertising, in which the control students showed significantly more change.  

Tollefson completed a study which indicated that students participating in a computerized strategy performed significantly better on both knowledge and application items than students completing the paper-pencil method of learning. The computerized strategy allowed self-pacing of learning and unlimited trials to mastery. The paper-pencil strategy was teacher-paced and students were permitted one trial on each exam.  

A study which revealed no significant difference between test groups was conducted by Kaminski, comparing instructional methods in microbiology. The Keller method and the traditional lecture method of instruction were evaluated for course achievement and attitude.  

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60 Jagdish Rai Kapoor, "An Experimental Study to Determine the Effectiveness of Two Methods in Teaching Collegiate Level Introduction to Business," Dissertation Abstracts International, XXXCIII (February, 1978), 4529A.  

61 Kapoor, p. 4529A.  


The preceding research efforts succeeded in identifying and evaluating various instructional strategies in the area of education. The following section regards various instructional procedures utilized in health education.

III. RESEARCH IN HEALTH EDUCATION

Conley and Jackson employed the Kilander-Leach Health Knowledge Test to examine the health knowledge of twelfth grade students for significant differences among schools, among content areas of health, and between sexes. 30 percent of the total senior population from 7 public high schools was randomly selected for the study. 64

The data obtained revealed that the students were weak in health knowledge with greatest weaknesses in community health, stimulant and depressant drugs, personal health, and communicable diseases. The researcher concluded that Aiken County, S.C., and probably many other counties and states, needed to throughly evaluate the health education programs for effectiveness in transferring health knowledge to the students. 65

64 J.A. Conley and C.G. Jackson, "Is a Mandated Comprehensive Health Education Program a Guarantee of Successful Health Education?" The Journal of School Health, XLVIII (June, 1978), 337.

65 Conley and Jackson, pp. 339-340.
The objective of a study by Yarber was to determine the health behavior status of senior high school students from two health classes. Based upon the evaluation, the researcher hoped to further develop the course curriculum and determine the effectiveness of the course instruction. A random sample was selected for each of the four health classes at the senior high school. Each participant responded to a pretest-posttest inventory to measure their health knowledge, attitudes, and practices. The investigator did not read any of the health inventory questions to assure that the health instruction would not be biased by knowledge of the test content. 66

Results of the study showed that:

1. the use of pre-test results was a desirable technique to determine the course of study;

2. health behavior as determined by the inventory improved during the health course; and

3. the use of the inventory served as a motivator for both the student and the instructor. 67

Thompson, in 1972, conducted a study to investigate the health knowledge level and practices of freshman students at predominantly black state colleges and universities. Data from the selected institutions were

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66 Yarber, pp. 235-236.

67 Yarber, p. 235.
collected utilizing the inventory technique.\textsuperscript{68}

The following major conclusions were drawn based on the findings of the study:

1. Freshman students in this study had critically limited health knowledge which in turn, limited their health practices.

2. The student's strongest areas of health were in the categories of personal health, family health, mental health, and dental health. The weakest category was community health.\textsuperscript{69}

Recommendations based on this study were:

1. That an intensive health course for freshman students be offered at all predominantly black state colleges and universities for two semesters instead of the usual one.

2. That the health instructional program in the colleges and universities in this study increase the scope and frequency of working with community organizations in promoting health knowledge and practices among youths and adults.

3. That health instruction at the freshman level emphasize knowledge and practices specifically on Infection and Disease: Drugs/Drug Abuse; Alcoholic Drinking and Smoking.

4. That Community Health be given particular instructional emphasis in collegiate programs

\textsuperscript{68}G. Thompson, "A Study of Health Knowledge and Practices of Freshman Students at Selected Predominantly Black State Colleges and Universities," Dissertation Abstracts International, XXXVIII (December, 1977), 3305A.

\textsuperscript{69}Thompson, p. 3305A.
especially with regard to practices.  

The investigation by Veener and Ismail was conducted to determine the effectiveness of three different approaches to health instruction at the college level: the problem-solving approach, the discussion approach, and the lecture approach. Three instruments were administered to the students to obtain initial and final measurements of health knowledge, health attitudes, and health interest. The instruments used were the Kilander Health Knowledge Test, the Byrd Health Attitude Scale and the Whitely Health Interest Checklist, respectively.  

The analysis of covariance was adopted for the evaluation of the data. Examination revealed no significant difference between problem-solving, lecture, and discussion approaches in the achievement of instructional outcomes. "These results imply that the selection of an instructional approach should be made on the basis of criteria other than the generalized observations concerning the significance of the approach." Such criteria may include the learners' attitude toward the instructional method, the ability of instructors to utilize the particular teaching method, and

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70 Thompson, p. 3305A.
71 Veenker and Ismail, p. 129.
72 Veenker and Ismail, pp. 134-135.
the availability of time, materials personnel, and facilities needed for various approaches.73

Weber conducted a study to compare the effectiveness of two different teaching methods in health education. Utilizing various health inventories, the researcher examined the values clarification approach and the lecture-question-and-answer approach. Results revealed no significant difference between approaches in health knowledge, health attitudes, health behavior, a flexible orientation to the world and nonauthoritarian thinking, and measures of self-actualization. Student evaluation of the teaching methods also showed no significant difference between instructional approaches.74

Fultz employed a selected number of students enrolled in Personal Health at a midwestern community college to determine the effects of a health hazard appraisal procedure. Student responses to various health inventories were examined for health knowledge, personal health concepts, and changes in health practices. Results of the study showed that use of the experimental health hazard appraisal procedure increased the knowledge level

73Veenker and Ismail, pp. 134-135.

and changed attitudes significantly more than the traditional health education program.75

IV. SUMMARY

Chapter II presented a review of the literature related to this study. The material was divided into three sections: (1) the goals and purposes of health education, (2) identification and evaluation of instructional methods, and (3) research in health education.

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CHAPTER III

METHODOLOGY AND DESIGN

The procedures and techniques used in this study have been divided into the following subtopics: (1) sample selection; (2) teaching methods; (3) testing procedures; (4) instruments; (5) statistical treatment and data analysis; and (6) summary.

I. SAMPLE SELECTION

Experimental Subjects

The experimental subjects in this study were students enrolled in the independent study method of instruction. Subjects were randomly selected at the time of class registration by permitting all students to enroll in either the independent study class or the traditional method of instruction. Students were informed of the independent study format but at that time were not told they would be part of an experiment. Most of the students who enrolled in the independent study class did so due to time schedule problems rather than because of the nature of the course.

A limit of 25 was set for the number of students
allowed to enroll in the independent study class. Since that limit was not reached, the selection remained random with all students having equal opportunity to select that method of instruction.

Of the 20 students enrolled in the experimental class, data were collected only from those students who completed the course.

Control Subjects

Control subjects in this study were individuals enrolled in the traditional method of study. Two controls were chosen for each experimental subject, matched according to predetermined variables of age, sex, race, classification, and grade point average. By controlling for these variables the researcher hoped to correct for any differences between the independent study students and the traditional method students. Such correction ensured that any differences that occurred in health knowledge or health attitude occurred because of the teaching method only.

The students were told they would be part of an experiment but were not informed of the exact nature of that research. Volunteers were matched as controls.

II. TEACHING METHODS

Both methods of instruction covered basically the same material for the Personal Health 100 course.
Independent Study Model of Instruction

The format for the experimental course of instruction was a modified Keller procedure. The Personal Health 100 course was subdivided into ten successive units. Each student was required to complete all ten units during the fall semester, 1978. The individuals were allowed to progress at their own rate; however, each unit had to be completed before the student could progress to the next unit. No more than two units could be completed in any single week.

The units consisted of textbook readings, written materials, audio-visual cassettes, and audio cassettes. The average amount of time required for a student to complete the course was approximately equivalent to the amount of time required in the traditional method of instruction.

Students were allowed to view the audiovisual cassettes and listen to the audio cassettes in the classroom during specified hours. The hours of operation were chosen based upon the student's schedules and preferred times. If extra time was needed, the instructor arranged special hours of study. Students were allowed to study all written materials outside the classroom. All materials, except the textbook, were provided by the instructor.

Either the instructor or a proctor was present during all class hours. The proctors were graduate assistants.
in the Department of Health and Safety. It was the responsibility of these proctors to set up study equipment for the students, administer and grade exams, and provide minimal tutoring when requested by the students.

An exam was administered at the completion of each unit. Each exam covered only that material presented in the preceding unit. The instructional model in this study differed from the original Keller model in exam procedures since mastery of units was not required of the students. Exams were given on a one trial basis. Test questions covered all study materials in the preceding unit and were objective in style. Each test included less than 50 true-false, multiple choice, and matching questions.

The exams were given during regular class hours unless the student requested a special testing period. Either the instructor or one of the proctors administered the exams. The student received results of his grade immediately, and positive information was provided for any incorrect responses.

The instructor reviewed all student responses to the test questions and determined if a grade change should be made. Such a change occurred when (1) the student misinterpreted the question, or (2) the student misread the question due to the fault of the instructor. Final grades for the class were based on the average of the exam scores.
Although the researcher for this study was also the instructor for the independent study phase of Personal Health 100, the researcher attempted to compensate for any possible bias in the investigation by:

1. random sampling of students;
2. use of proctors in preliminary grading of exams and in student tutoring; and
3. use of the previous materials used in the independent study instructional model.

The independent study procedure had been in effect two semesters at the time of this investigation. However, the former system included only nine units of study. Each unit and exam was prepared by a different instructor according to that instructor's major interest area. It was necessary for the instructor during this investigation to reconstruct the system before the course began for the fall semester of 1978. Reasons for these changes were:

1. adoption by the Health and Safety Department of a different textbook for Personal Health 100;
2. implementation of new materials made available for this course; and
3. nonconfidentiality of text materials and questions from previous semesters.

Over one half of the course material remained identical to materials used in the previous semesters.
The greatest difference involved use of a different textbook.

**Lecture Model of Instruction**

The students in the lecture method of instruction were expected to attend lectures two and three days per week, read the textbook, complete any given assignments, and take exams. On scheduled class days, the instructor chose to (1) lecture or have guest speakers; (2) conduct class group discussions; or (3) have film or slide presentations related to the subject matter being covered.

Exams were administered on scheduled class days. Students were allowed one trial per test. Make-up exams were given only to students with excused absences. Grades for the course were based primarily on these exam scores, although some instructors graded also on class attendance and/or participation.

To compensate for any possible bias on the part of the researcher, control students were selected from five lecture classes taught by different instructors. The instructors varied in: (1) teaching experience; (2) method of teaching, although all instructors followed the basic lecture format; (3) number of exams given and material covered by each exam; and (4) type of exams given. The researcher instructed one of the five lecture classes.
III. TESTING PROCEDURES

Subjects were tested for health knowledge and health attitudes by use of a pretest-posttest design. Tests were administered to the students during scheduled class hours of the independent study model. The tests were given by either the instructor or one of the proctors for the independent study class. Subjects were not allowed any help from the instructor, classmates, the textbook, or other sources.

Pretest

Students enrolled in the independent study approach to Personal Health 100 were given the pretests of the Kilander-Leach Health Knowledge Test and the Olsen's Health Attitude Inventory the first week of the semester. Subjects were not allowed to begin the course until after completion of these two test instruments.

Students enrolled in the lecture method of study were asked to complete the two tests during the first two weeks of school. The extended testing period was due to the time required by the researcher to match the two control subjects with each experimental subject.

Posttest

Students in the experimental independent study class were given the test at the completion of the ten course units. Those individuals who had not completed
all ten units took the test instruments during the thirteenth week of the sixteen week semester. Subjects in the traditional phase of instruction also responded to the post-test questionnaires during the thirteenth week of the fall semester.

Since both methods of instruction were designed following basically the same course outline, each group received approximately the same amount of instruction regarding all subject matter in the course. The researcher did not feel that either group had an unfair advantage in responding to the tests.

IV. INSTRUMENTS

Kilander-Leach Health Knowledge Test

This test was designed to measure the extent of a college student's health knowledge and understanding of health related matters. The instrument tested student responses in nine areas: Personal Health; Nutrition; Community Health; Sanitation; Communicable Diseases; Safety; First Aid; Family Living; and Mental Health. The test material included common errors, misconceptions and superstitions.

The test consisted of 100 questions. The reliability coefficient was .80±.007 for college freshmen.¹

¹Letter from Dr. Glenn C. Leach, coauthor of the Kilander-Leach Health Knowledge Test, August 14, 1978.
Olsen's Health Attitude Inventory

The Olsen's Health Attitude Inventory was developed in 1971 by Dr. Larry K. Olsen at the University of Illinois. The instrument is divided into six major categories and twenty-two subunits. The six major categories are:

1. Understanding mood and behavior modifying substances;
2. Developing health sexuality;
3. Prevention and Control of disease;
4. Effective living in the community;
5. Developing and maintaining health;
6. Developing a healthy personality.

The 22 subunits of the health attitude instrument are: (1) Use of Mood and Behavior Modifiers; (2) Homosexuality; (3) Sex Education; (4) Birth Control; (5) Premarital Sexual Relationships; (6) Divorce; (7) College Marriages; (8) Abortion; (9) Disease Prevention (general); (10) Disease Prevention Factor I; (11) Disease Prevention Factor II; (12) Effective Living in the Community; (13) Community Health Laws; (14) Environmental Health; (15) Developing and Maintaining Health; (16) Nutrition; (17) Self Medication; (18) Exercise; (19) Health Education; (20) Mental Illness; (21) Mental Adjustment; and (22) Lie Factor.

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3. Letter by Dr. Larry K. Olsen.
Reliability of each subscale was computed using a sample of 173 college students. The reliability coefficient ranged from .76 to .86.⁴

V. STATISTICAL TREATMENT AND DATA ANALYSIS

A two-tailed T-test was selected for the data analysis due to the small sample size. The .05 level of significance was selected for evaluation of the null hypothesis using the following algebraic formula:⁵

\[
T = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\left(\frac{(N_1-1)S_1^2 + (N_2-1)S_2^2}{N_1+N_2-2}\right) \left( \frac{1}{N_1} + \frac{1}{N_2} \right)}}
\]

\[
df = N_1+N_2-2
\]

VI. SUMMARY

Chapter III explained the methodology and design of this investigation. The chapter was subdivided into units of sample selection, teaching methods, testing procedures, instruments, and statistical treatment and data analysis.


CHAPTER IV

ANALYSIS OF DATA

Each experimental subject was matched with two control subjects according to the predetermined demographic variables. Two of the experimental subjects were matched with only one control subject due to the failure of two individuals in the control group to complete the test instruments. The identification codes of the matched groups are displayed in Table 1.

Tables 2 and 3 identify the calculated scores of the experimental and control populations, respectively. The scale on the Olsen's Health Attitude Inventory was given a numerical value of one to five, with five indicating the most positive attitude. The scores to each question were summed to give the total health attitudinal score of each subject. Since the inventory contained 110 questions to be answered on a scale of one to five, the minimum possible score was 110 and the maximum possible score was 550.

The pretest score was subtracted from the posttest
Table 1

Matched Subjects of the Experimental and Control Populations

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score to calculate the Olsen score difference. The positive
and negative numbers represented a positive or negative
attitude change, in that order. The higher the difference
score, the more positive the attitude change of the indivi-
dual. The ranges of the Olsen score differences were 44 to
-8 for the experimental population and 32 to -12 for the
control group.

The pretest scores of the Olsen's Health Attitude
Inventory showed a mean of 400.071 and a standard deviation
of 21.187. Based on a normal distribution, this indicated
that approximately 98 percent of the scores in a population
would be expected to fall within the range of 336.51 to
463.632, or 3 standard deviations above or below the mean.
The median varied only 4.6 points from the mean value, giving
evidence to the fact that there were no extreme scores to
influence the statistical analysis of this study.

The posttest scores of the Olsen's Health Attitude
Inventory revealed a mean of 410.536 and a standard
development of 18.498, indicating that ninety-eight
percent of the individual scores in a normally distributed
population would be expected to fall within the range of
355.042 to 466.03. The median varied 3.5 points from the
mean.

The mean of the Olsen score difference was 10.464
and the standard deviation was 13.079. According to these
calculations, 98 percent of the subjects in a population similar to the one tested by this study would have a difference score value between -18.309 and 49.701. The median difference value was 10.5.

The Kilander-Leach Health Knowledge Test was graded based on correct/incorrect answers. The score was recorded as the number of correct responses out of a possible 100. The Kilander Score difference was calculated by subtracting the pretest score from the posttest score for each individual. A positive score difference revealed a knowledge gain whereas a negative score difference represented a health knowledge loss. These scores for the experimental and control populations are displayed in tables 2 and table 3.

The pretest scores of the Kilander-Leach Health Knowledge Test had a mean of 63.786 and a standard deviation of 10.101. Based on these figures, approximately 98 percent of the pretest scores in a normal distribution would be expected to fall between 33.483 and 94.089. The median of this data used in the study varied only one point from the mean so statistical calculations were not affected by extreme scores.

The Kilander-Leach posttest scores for the experimental and control populations showed a mean of 69.036 with a standard deviation of 8.583, indicating that 98 percent
of the scores would fall between 43.287 and 94.785. The median for the group in this study was 69.5.

In the sample populations for the Kilander score difference, the mean was 5.25 and the standard deviation was 7.619. According to these figures, approximately 98 percent of the difference values in a normal distribution of subjects would fall between -17.607 and 28.107. There were no extreme scores in the sample population since the median was equal to the mean.

Table 4 displays the results of the T-tests. Six separate tests were performed according to the following variables; pre-Olsen, post-Olsen; pre-Kilander, post-Kilander; Olsen score difference; and Kilander score difference.

The mean and standard deviation of each population were determined before the T values could be calculated. The standard error of the sample groups was calculated to allow for any cases which happened, by chance, to be included in the sample. The researcher would not expect to find the questionable cases in the same ratio for the reference population as they were found in the sample populations. In this study, the calculated standard errors were relatively low, indicating that there was little difference between the two sample populations.

The T values were calculated according to the algebraic formula stated in Chapter III. These values
Table 4

Computed T-Test Values of the Sample Populations

<table>
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<tr>
<th>Variable</th>
<th>Number of Cases</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Mean</th>
<th>Standard Deviation</th>
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<th>* Table Value .05 Level of Significance</th>
<th>Degrees of Freedom</th>
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were compared to the Table value of a two-tailed T-test at the .05 level of significance for 26 degrees of freedom. Results of the T-tests showed no significant difference between the experimental and control groups for any of the following six variables: pre-Olsen; post-Olsen; pre-Kilander; post-Kilander; Olsen score difference; and Kilander score difference.

The mean score for health knowledge did not differ significantly between the traditional and independent study models of Personal Health 100. Also, the mean score for health attitude change did not significantly differ between the traditional and independent study models of instruction for Personal Health 100. Based on this finding, the researcher accepted the null hypotheses of this study.

The researcher deemed it necessary to calculate four more T-tests to determine if a significant difference existed between the pretest and posttest scores within instructional groups. The results, as shown in Table 5, reveal no significant differences at the .05 level of significance. Based on these findings, health instruction makes no significant difference regarding student performance on the Kilander-Loach Health Knowledge Test or the Olsen's Health Attitude Inventory.
<table>
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<th>Variable</th>
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CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

Purpose of the Study

The purpose of this study was to compare the independent study instructional model with the traditional instructional model to determine the effectiveness in promoting health knowledge gain and a health attitude change.

Importance of the Study

With the development of various new instructional strategies, health educators have become concerned with selecting the best method of instruction. Educators must choose a method which is most favorable to the achievement and retention of educational objectives. This research provides necessary data for the comparison of two separate instructional models concerned with health knowledge and health attitudes.
Procedure Followed

A random sample of 28 students enrolled in a Personal Health 100 class was obtained. This included 10 experimental subjects and 18 control subjects matched according to preset demographic variables. A pretest-posttest design utilizing two standardized instruments was employed to measure the health knowledge and health attitude changes of the subjects. Statistical analysis of the data involved use of a T-test.

Findings

The findings of this research revealed:

1. There was no significant difference between the experimental and control groups regarding prior health knowledge.

2. There was no significant difference between the experimental and control groups regarding health attitudes at the beginning of the study.

3. There was no significant difference between the experimental and control groups regarding health knowledge gain or loss upon completion of the Personal Health course.

4. There was no significant difference between the experimental and control groups regarding positive or negative health attitude change upon completion of the Personal Health course.
II. CONCLUSIONS

On the basis of the data presented in this study, the following conclusions appeared warranted:

1. Since there appeared to be no significant difference between instructional methods regarding health knowledge or health attitude, the instructor is free to choose either method based on personal preference, available time and materials, student preference, or other variables. If an educational objective other than health knowledge or health attitude is of primary importance, then a separate study should be consulted before deciding upon an instructional method.

2. It was the observation of the researcher that the independent study model required more pressure on the part of the instructor to prompt students to complete the course requirements than did the traditional classroom model. This could be a determining factor in selecting an instructional model.

3. Control subjects were matched to the experimental subjects according to predetermined demographic variables. Based on this information, all differences between the two groups should have been the result of the instructional method rather than an intervening variable.

4. A total of five different instructors taught the traditional lecture classes. The researcher did not feel
this factor had any significant influence on this study. The majority of the control subjects were enrolled in classes taught by first year instructors. The experimental subjects were also taught by a first year instructor.

5. Although this study revealed no significant difference between the two groups regarding health knowledge or health attitude, it is the opinion of the researcher that a type II error may have occurred. The majority of the control subjects had been exposed to two to six lectures at the time of the pretest. This influenced their responses to the research instruments, probably increasing the test scores. The experimental subjects were not influenced by this factor since the researcher/instructor required completion of the questionnaires prior to starting the course of independent study. This test response difference would not only influence the pretest data, but also the pretest-posttest difference score for the two instruments. Thus, a difference between the two sample groups may actually exist.

6. Due to the time limitation, it was necessary for the researcher to administer the posttest instruments during the thirteenth week of the sixteen week semester. At this time, subjects were involved at different levels of progress through the course. This was especially true of the experimental subjects as several of these students failed to maintain a reasonable pace of course progression.
Pretest-posttest difference scores, as well as posttest scores, may have been influenced to the extent of affecting the research findings. If the pretest-posttest score were lowered significantly, this would have caused a type II error in the statistical analysis.

7. The size of the lecture classes may have caused some bias in this study. None of the lecture classes had over 40 students so the instructors had time to give individual attention to the students. A large lecture class might not be as effective in promoting health knowledge and health attitude change.

8. The results of the T-tests regarding health knowledge gain and health attitude changes within the separate groups led the researcher to believe the instruments used were invalid for this study. The Olsen's Health Attitude Inventory was formulated in 1971. Since that time, society has changed its attitudes and standards regarding many issues, such as abortion, pollution, and sex. This would influence the subject's responses to the questions and could perhaps raise or lower the health attitude score significantly.

9. The Kilander-Leach Health Knowledge Test was probably invalid for the collegiate level. The mean score for the pretests in both groups was only slightly above the norm for high school students and the posttest mean
score was slightly below the norm for college students in the Kilander-Leach study.\(^{1}\) This seems to indicate that the students in the Personal Health 100 course had been exposed to the information tested by the Kilander-Leach Health Knowledge Test prior to enrollment in the college course. Based on this, the researcher did not feel the instrument asked significant questions in the areas of instruction.

The researcher thus concluded that poor instrumentation was a major factor in the outcome of this study.

III. RECOMMENDATIONS

Recommendations for changes in the independent study model of instruction and for further research in this area are as follows:

1. A limit of two units per week was set for the students enrolled in the independent study course but there were no due dates for the units other than the requirement that all ten units be completed during the single semester. This resulted in many students trying to complete over one half the units during the final weeks of the semester. The instructor should perhaps develop guidelines for reasonable progress through the course. With these guidelines, the students could determine if they were progressing

\(^{1}\)Letter from Dr. Glenn C. Leach, coauthor of the Kilander-Leach Health Knowledge Test, August 14, 1978.
test instruments. Medical technology and knowledge advances so rapidly that test instruments may soon become outdated. Also, with increasing emphasis being placed on health education, students gain information regarding health in their pre-college courses. This can make some test instruments too general for collegiate level research.

Validity of a test instrument may be measured by administering the pretest-posttest instruments to several classes outside the health field. If these subjects show no significant difference in the pretest-posttest differences within groups, then the instrument is too general for evaluation of an introductory college health course.

7. Ideally, only one instructor should be involved in the study regarding teaching methods. The use of several instructors lowers the researcher's control of the base group. If necessary to involve several teachers, they should have equivalent levels of education and experience on the college level. Also, the instructors should agree on the topics to be taught and adhere to those topics.

8. Pretest data should be evaluated to determine the weakness areas of the subjects. Posttest responses should also be evaluated to determine if those areas of weakness change after instruction.

9. The .05 level of significance was used in this study. Other studies could be conducted and the data analyzed using the .01 level of significance. A different statistical
at a pace which would allow for successful completion of the course.

2. A log regarding lab use should be kept so the hours of operation for the independent study lab could be adjusted for maximum utilization by the students.

3. Item analysis should be conducted on the unit tests of the independent study course. This could be done by teaching the separate units in a lecture class, administering the tests, and using this larger sample for the item analysis.

4. A similar study should be conducted with two major changes. First, the pretest instrument should be given to all subjects before the beginning of the course. This would lower the possibility of a type II error. This change would be possible through a preregistration procedure for course enrollment, giving the researcher time to select and test both the experimental and control subjects before the course actually began. Second, the posttest instrument should be administered after completion of the entire course. Time was a major limitation of the researcher for this study.

5. Controls could be matched according to the demographic variables of age, sex, race, academic classification, and grade point average as was done in this study. However, the additional variables of choice of major and/or previous courses completed in related areas should also be taken into consideration.

6. A similar study should be conducted using different
formula such as analysis of variance, could be used to analyze the data, rather than a T-test.
APPENDICES
APPENDIX A

INSTRUMENTS AND SCORING KEYS
HEALTH KNOWLEDGE TEST

1. Many people lack emotional stability in adult life. This characteristic most probably is traceable to: 1. Early home life 2. Early school life 3. Bad companions 4. Heredity

2. All except which one food can be used instead of meat as a source of protein? 1. Fish 2. Dried beans and peas 3. Macaroni 4. Poultry

3. Which one is a voluntary health agency, as the term is commonly used? 1. Metropolitan Life Insurance Company 2. U.S. Public Health Service 3. National Tuberculosis Association 4. American Medical Association

4. The blood test required in many states before a marriage license is issued is for the purpose of determining whether or not either party has: 1. Syphilis 2. Gonorrhea 3. Tuberculosis 4. Hemophilia

5. What is missing in an otherwise well-balanced breakfast made up of a glass of strained orange juice, a cooked egg, 2 slices of enriched white bread, and a glass of whole milk? 1. Vitamins 2. Roughage 3. Protein 4. Minerals

6. The best rule to follow to prevent constipation is to: 1. Take a laxative regularly once a week. 2. Avoid cheese since it is considered to be binding. 3. Eat plenty of food high in water content such as soups and beverages. 4. Eat regularly foods containing roughage such as vegetables, fruits and whole grain bread.

7. The World Health Organization, known as WHO, is: 1. An agency of the old League of Nations. 2. An independent international agency working closely with the UN. 3. An agency of the United Nations. 4. A loose international federation which includes most countries but not Russia and its satellites.

8. Which temperature of the bath water is most conducive to relaxation when one is nervous? 1. Hot 2. Warm 3. Cold 4. Hot followed by cold


10. Fatigue due to sedentary or mental work is best relieved at the end of one's working hours by: 1. Coffee 2. Sleep 3. A shower 4. Recreational activity of a physical type

11. Which statement about the inheritance of allergies is the most accurate? 1. Allergies are inherited. 2. Allergies are not inherited. 3. The tendency to develop allergies is inherited. 4. It is not known definitely whether there is an inherited factor.

12. Comment on the statement: A fever can be "killed" by drinking whiskey. 1. This is true. 2. There is neither harm nor value in this method. 3. It frequently helps. 4. It is more dangerous than helpful.

13. Which of the following statements is correct? 1. Excessive masturbation leads to insanity. 2. Excessive masturbation leads to sterility. 3. Masturbation is not physically harmful, and is usually outgrown. 4. Masturbation is participated in by the male species only.
14. The process whereby a sperm and egg unite is known as fertilization. By which other name is it also called?

15. Which is the best way to arrange a chair and writing desk in a room with windows only on one side and for a right-handed person?
1. Facing windows 2. With right side toward windows 3. With back to windows 4. With left side toward windows


17. Of the various forms of insurance, the one that offers hospitalization benefits is known as: 1. American Hospital Plan 2. Blue Shield 3. Blue Cross 4. Major Medical

18. A college degree is required in order to take up specialized study in three of these fields. For which one is a high school diploma sufficient?

19. Can a prospective mother make her child more musical if she listens to good music?
1. Yes, several prominent musicians can ascribe their musical ability to such a procedure. 2. It is doubtful that it would have such an effect. 3. Probably, if the mother does so during the entire prenatal period. 4. It is contrary to the facts of heredity to expect this.

20. A person has cut an artery in the forearm. A tourniquet should be applied:
1. On the side of the cut toward the wrist 2. Either at wrist or elbow 3. On the side of the cut toward the elbow 4. Both at wrist and elbow

21. The most serious type of fatigue is induced by:

22. Having which one of these diseases is most likely to be fatal?

23. Which one statement concerning the heart and exercise is incorrect?
1. If heart trouble is already present, excessive muscular activity may lead to trouble. 2. Some heart patients benefit from medically prescribed exercise. 3. Exercise causes "athlete's heart." 4. The death rate from heart disease is lower for people who do heavy physical work as compared with those who do sedentary work.

24. That field of medicine which deals with the aged is known as:

25. For people at sedentary work, 68 degrees is the ideal room temperature because:
1. It keeps the humidity sufficiently low. 2. We are accustomed to that temperature. 3. It is the temperature at which our body makes heat at the same rate that it loses it without shivering or perspiring. 4. It is the nearest temperature to that of summer.

26. The best method today of lowering the death rate from cancer is by:
1. Early diagnosis. 2. Repeated use of radium and X-ray. 3. Improvement in one's general health. 4. Early operation.

27. In fighting biological warfare, you as a citizen should:
1. Identify germs, toxins or poisons before reporting them. 2. Avoid washing or dry cleaning any contaminated clothing. 3. Wear air-tight face mask and suit covering entire body. 4. Report all unusual symptoms and illnesses to your local or civil defense authorities.
28. The cooking of foods decreases particularly the value of:

29. Is the "taste" for alcohol inherited?
   1. Yes  2. Yes, in some cases  3. Yes, in most cases  4. No

30. When a strong acid has accidentally come in contact with the skin, one should immediately:
   1. Wash it off with plenty of water, preferably alkaline.
   2. Cover it with oil.  3. Apply an ointment dressing.
   4. Wash it off with rubbing alcohol.

31. Astigmatism is defined as:
   1. An infection of the eye  2. Weak eyes  
   3. A type of nearsightedness  4. Imperfect curvature of the eye

32. Gonorrhea may cause:

33. The number of cases of organic diseases such as heart trouble and cancer compared with communicable diseases such as typhoid, tuberculosis, and diphtheria is:
   1. Increasing  2. The same  3. Decreasing  4. Not known

34. In which way is sugar used in the body?
   1. To yield energy  2. To build tissue  3. To regulate the body processes  4. To yield energy and build tissue

35. The souring of milk is hastened most quickly by:
   1. Thunderstorms  2. Pasteurization  3. Leaving the bottle uncovered in the refrigerator
   4. Poor refrigeration

36. What is the relative professional competency of medical doctors in comparison with chiropractors in treating disease?

37. Which of the following statements about syphilis is the only correct one?
   1. It is a hereditary disease.  2. Once a person has contracted it, he develops an immunity toward it.  3. The latent stage may cause heart defects or insanity.  4. It is often acquired from dirty toilet seats or towels.

38. In attempting to reduce the rate of tuberculosis, this disease should be considered primarily:

39. What is meant by "tolerance" as used in speaking of drug addiction?
   1. A sense of well-being and relaxation caused by the drug.  2. The need for larger doses of the drug with continued use.  
   3. Physical dependence on the drug.  4. Emotional dependence on the drug.

40. Three of these countries have relatively low death rates; for which one is the death rate the highest?

41. Which disease is transmitted most readily and quickly by personal contact?

42. Milk, which is high in protein and vitamins, completely lacks which one of the following food essentials?

43. Which one of these factors contributes most to mental health?
44. What is it in tobacco smoking which causes lung cancer? 1. Nicotine 2. Tobacco tars 3. Carbon monoxide in tobacco smoke 4. The heat of the smoke

45. Which factor most frequently makes the air less healthful in heated homes or offices during the winter? 1. Room temperature kept too high 2. Dampness 3. Lack of sufficient oxygen 4. Too much carbon dioxide


47. For which communicable disease must you present a certificate of successful vaccination when you return to the U. S. from abroad? 1. Yellow fever 2. Chickenpox 3. Smallpox 4. Cholera

48. Which one of these symptoms is NOT a symptom of shock? 1. Cold perspiration on forehead 2. Strong pulse 3. Shallow, irregular breathing 4. Dilated pupils of eyes


50. The type of illness that occurs when emotional tension creates functional bodily disorders, such as headaches and high blood pressure, is known as: 1. Psychosomatic condition 2. Neurosis 3. Psychosis 4. Insanity


52. The oxygen taken in by the lungs is carried to the body tissues by which one of the following substances? 1. White blood cells 2. Blood platelets 3. Red blood cells 4. Autocoids


54. The Federal Food, Drug and Cosmetic Act prohibits: 1. False advertising in newspapers 2. The sale of products in the same state in which they are made 3. False advertising on the package 4. Both sale and advertising of product

55. A glass of drinking water contains approximately how many calories? 1. None 2. 10 3. 100 4. 200

56. Which one of the following is favorable to the maintenance of a healthy mind? 1. Introspection 2. Monotonous living 3. Cultivation of hobbies 4. Emotionalizing over one's handicaps


58. Which one of these chemical salts, when found in drinking water or applied to the teeth, helps to reduce tooth decay? 1. Chlorides 2. Fluorides 3. Sulphates 4. Carbonates

59. When it is time for the baby to be born: 1. The navel gradually opens to let the baby out. 2. The muscles of the uterus contract to force out the baby. 3. The Fallopian tube expands to permit the baby to pass through. 4. None of these three statements applies.

60. The main function in perspiring (sweating) is: 1. To eliminate body poisons 2. To regulate the temperature of the body 3. To get rid of excess water 4. To cleanse the surface of the body
61. Various marks of disfiguration on a newborn child are due to the fright of the mother during pregnancy. 1. This has frequently happened. 2. It may happen when the fright occurs early in pregnancy. 3. It may happen when the fright occurs during last 3 or 4 months of pregnancy. 4. There is no biological basis for this statement.


63. Human whole blood or some of its derivatives can be used in the treatment of all except which one? 1. Shock 2. Goiter 3. Anemia 4. Burns

64. Which is the correct view in regard to "cousin marriage"?
1. Such a marriage almost always results in some inferior children.
2. It frequently results in mentally deficient children.
3. It is not likely to result in deficient children any more than any other marriage.
4. It is biologically undesirable if undesirable inheritable traits are known to be present in the family.

65. Cigarette smoking produces all of the following effects except which one?
1. It causes shortness of breath. 2. It causes an increase in mental alertness. 3. It causes a measurable rise in blood pressure. 4. It makes the extremities (feet and hands) cold.

66. The dangerous gas contained in manufactured illuminating and cooking gas is:

67. Three of the following services are considered to be functions of the city and county health departments. Which function is NOT the health department's responsibility?
1. Compiling vital statistics
2. Providing for sanitation in the community
3. Providing for communicable disease control
4. Caring for the needy

68. In order to recover from tuberculosis, which procedure is most important?
1. To rest a great deal 2. To move to a dry climate 3. To exercise by taking long walks 4. To take injections of tuberculin

69. During which age period will the lack of proper food result in most harm?
1. From birth to 6 years 2. Childhood—6-12 years 3. Adolescence—12-18 years 4. Early maturity—18-24 years

70. Is fish a brain food?
1. It is, because fish is rich in protein similar to that found in the brain.
2. It is of value because it contains quantities of the salts found in the brain.
3. It is doubtful whether enough fish can be eaten to make much difference.
4. No one type of food is used specifically for one organ or region such as the brain.

71. Can communicable diseases be inherited? (Consider only biological inheritance.)
1. Many but not all communicable diseases can be inherited.
2. It is only occasionally that such diseases are inherited.
3. Tuberculosis is one of the two or three communicable diseases that may be inherited.
4. Communicable diseases cannot be inherited.

72. Which one is the best reason why patent medicines should NOT be used?
1. They are too expensive for what a person gets from them.
2. They stimulate one too much by means of harmful drugs.
3. They may cause a person to become a drug addict.
4. They may contain substances that give temporary relief while the condition causing the trouble grows worse.
73. Can rheumatism be cured by the application of rattlesnake (or other snake) oil?
   1. This is an old, reliable remedy used in the west.
   2. It is known to have helped in many instances.
   3. There is no value in this remedy.
   4. Snake oil will cure only when rubbed in thoroughly.

74. Venereal diseases (syphilis and gonorrhea) are most frequently contracted in which age group?
   1. 13-18 years  2. 19-24 years  3. 25-30 years  4. 31-36 years

75. Most people who are overweight are so primarily because:
   1. They exercise too little.  2. They have inherited the tendency.  3. They have an underactive thyroid gland.  4. They eat too much fattening food.

76. "Handling toads or frogs is a cause of warts forming on the hands."
   1. This statement is true.  2. It is true only for toads, not for frogs.
   3. It is doubtful whether frogs or toads can cause warts.
   4. Both animals can be handled without fear of getting warts from them.

77. Anemia is a disease in which the individual may not have sufficient:

78. Active acquired immunity develops when a person has a disease and then recovers from it. For which pair of diseases is this common?

79. According to present scientific knowledge, which one is entirely attributed to heredity?

80. The human embryo gets its food through:

81. The main value in the use of a dentifrice (toothpaste or powder) is to:
   1. Help scour and clean the teeth  2. Kill bacteria in the mouth
   3. Neutralize bad mouth odors  4. It has no value

82. It is through the Eustachian tube that infections in the nose frequently spread to:

83. Which statement is most often true about alcoholics?
   1. They eventually become insane.  2. They show personality changes.
   3. They suffer from infectious diseases.  4. They suffer from malnutrition

84. Which is the incorrect statement?
   1. Marijuana is a synthetic drug.
   2. Marijuana may produce hallucinations.
   3. Marijuana does not produce a physical dependency.
   4. Marijuana may lead to the use of heroin.

85. Can a swelling or a "black eye" due to a bruise be reduced by applying raw meat?
   1. It works in many instances because raw meat is able to absorb the liquid which otherwise would cause the swelling to develop.
   2. Statement (1) holds true only for certain kinds of meat such as beefsteak.
   3. It works at times because of a special enzyme in meat.
   4. There is no special value in the use of raw meat in the treatment of bruises.

86. Tuberculosis in childhood is acquired most frequently by getting the germs:
   1. Through inheritance  2. From street dust  3. From contact with adults who have the disease.  4. By drinking milk from infected cows
87. Which statement is correct concerning lighting and television watching?
1. TV gives off certain harmful rays that may injure the eyes.
2. It is best to sit slightly to the side of the TV screen when viewing it.
3. Moderate indirect lighting for the room as a whole is recommended for minimum eye strain.
4. There should be sufficient contrast between the lighting in the room and that from the TV screen.

88. Which vitamin should be included in children's diets in order to prevent rickets?

89. In the event of a heart attack, which procedure is wrong?
1. Keep patient quiet.
2. If patient so desires, have him slowly walk around to stimulate his circulation.
3. Assist patient to a comfortable position.
4. Provide moderate warmth.

90. Antibiotics refer to:
1. Drugs used in combating certain diseases
2. A special food for infants
3. A disinfectant for sterilizing utensils
4. A hormone for preventing certain diseases

91. Four of the following represent types of neurosis; which one is a type of psychosis?

92. Botulism refers to:
1. A type of food poisoning
2. One of the newer drugs
3. An enzyme
4. A tropical disease

93. The periodic health examination is valuable in the detection and prevention of all except which one of these diseases?
1. Typhoid fever
2. Heart disease
3. Diabetes
4. Cancer

94. Which department of the Federal Government is responsible for the control of narcotics and drug abuse?
1. Department of Justice.
2. Department of the Treasury.
4. Department of Commerce.

95. The physiological effect of alcohol upon the nervous system is:
1. As a stimulant
2. As a depressant
3. As both a stimulant and a depressant
4. Either, depending upon the person

96. The average life span (expectation of life at birth) during the past century has been increased from about 30 years to about 70 years. This change has been accomplished mainly by:
1. Preventing infant deaths
2. Reducing diseases of old age
3. Equally by both (1) and (2)
4. It is not definitely known

97. The best thing to do when fatigued from a strenuous day of muscular work is to:
1. Take a cold shower to "pep one up."
2. Massage the tired muscles.
3. Take further exercise to "work off" the fatigue toxins.
4. Sleep it off.

98. What is the best thing for a person to do who feels that he is about to faint?
1. Move to fresh air.
2. Drink some cold water.
3. Lower the head between the knees.
4. Have someone rub his forehead with a rotary motion.

99. Which one of these factors contributes most to automobile accidents?
1. Car design
2. Weather
3. Human element
4. Defects of car

100. Which one of the following statements on teeth and their care is true?
1. Since wisdom teeth (third molars) are useless and decay early, the sooner they are extracted, the better.
2. "Pink toothbrush" can be cured by the right kind of toothpaste.
3. Eating soft, sugary foods and candies contributes to tooth decay.
4. One's physical condition has little effect on the health of the teeth.
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1. Hypochondriasis
2. Hysteria
3. Neurasthenia
4. Paresis

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**Key**

Kilander-Leach Health Knowledge Test 1972 Edition

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Directions: MAKE NO MARKS IN THIS BOOKLET. All responses must be made on the answer sheet provided.

The key to the responses remains constant throughout this inventory. The key is as follows:


If you Strongly Agree with an item, mark column "1" in the space provided on the answer sheet. If you Strongly Disagree with an item, you would mark column "5" in the space provided on the answer sheet. Be sure that the item number in the booklet corresponds with the item number on the answer sheet.

1. Not facing reality is the basis of most problems.
2. Too much fuss is being made over health problems.
3. The best way to combat venereal disease is through education.
4. College marriages are usually doomed to failure.
5. Divorce is a reflection of poor mate selection.
6. Mental health is important to total well-being.
7. First aid should be a required college course.
8. Divorce is immoral.
9. Chiropractors should be admitted to the American Medical Association.
10. As a college student, there is not much I can do about disease prevention.
11. You should inform the health department of noticeable unsanitary conditions existing in a restaurant even though it may be owned by a friend.
12. Too much fuss is made over the food we eat.
13. I dislike the idea of abortion but do not object to others feeling it is alright.
14. Too much fuss is made over environmental pollution.
15. Too much fuss is made over disease prevention.
17. All community health programs do is raise my taxes.

18. College marriages are no different than any other marriages.

19. Too much fuss is made over weight control.

20. Diet pills are the easy way out for lazy people.

21. Methedrine should not be used by anyone.

22. A person should avoid self-medication even when very ill and the services of an MD are not immediately available.

23. The best way to relieve tension or stress is to take a tranquilizer.


25. Homosexuals should be put some place where the rest of society does not have to put up with them.

26. Most people do not have enough health education.

27. Free love is one of the worst problems in today's society.

28. A person should work for fluoridation even though there may be vigorous opposition from some community members.

29. With all the water available, water pollution is not really a big threat.

30. If people had better eating habits, they would not need diet pills.

31. A carefree attitude is the key to adjusting to college life.

32. The practice of birth control is worthwhile.

33. If people would think, they would not vote for health legislation.

34. To tell a college student about food and diet is a waste of time.

35. A person should brush his teeth promptly after eating regardless of his work schedule or other business.

36. Drinking alcohol is a waste of money.

37. Self-prescribed Vitamin pills are usually a waste of money.

38. Diet pills are good for self medication.

39. It takes a very mature couple to make a college marriage work.
63. Birth control is as much a man's responsibility as a woman's responsibility.
64. People with mental illness should be kept in a mental hospital.
65. A person should bathe, use a deodorant and wear clean clothes daily regardless of his profession.
66. Weight control is not a concern of college students.
67. More public education about abortion is needed.
68. The only good thing about health laws is with respect to ship quarantines.
69. People with syphilis have low moral character.
70. Physical exercise is more bother than it is worth.
71. Divorce is better than living with someone you do not love.
72. When you need a pill for a headache, it is all right to borrow a friend's prescription.
73. Mental illness can never be really cured.
74. Sexual promiscuity will be the downfall of our society.
75. Health legislation is forced medication.
76. A person should always go to bed when feeling ill regardless of pressures of work or social life.
77. Homosexuals have received much undue publicity.
78. I have enough problems without thinking about sanitation also.
79. Education does little with respect to disease prevention.
80. Too much fuss is made over sex education.
81. No one should be told if a family member of mine has been in a mental hospital.
82. Physical exercise is a good way to reduce tension.
83. There is not much I can do in the fight against air pollution.
84. Homosexuality repulses me.
85. College students should budget their time to include recreational activities.
86. Birth control pills should be available at the college health service.

87. A person should drink milk or fruit juice in preference to other less nutritious beverages served at social gatherings.

88. People who wear seat belts all the time are overly cautious.

89. Popular magazines are good sources of reliable health information.

90. Mentally ill people need more consideration from our society.

91. Sexual intercourse before a person is married is immoral.

92. Health education should be a mandatory subject from elementary school through college.

93. People who use marijuana are looking for an easy way out or responsibilities.

94. Recreation is a drag.

95. Abortion is a completely unjustifies act.

96. Birth control is a waste of money.

97. Each day a person should engage in recreation which provides vigorous activity and a change from his usual occupation.

98. Only people who care nothing about themselves would smoke.

99. The value of immunizations is questionable.

100. People who use LSD are playing with fire.

101. Health education is ridiculous.

102. Homosexuality is all right between two consenting adults.

103. Health information should be distributed to all entering freshmen.

104. If more people were concerned about accident prevention.

105. More public education is needed about mental illness.

106. Divorce destroys society.

107. Physical fitness activities are not sufficiently appreciated by college students.

108. Self-medication is a dangerous practice.

109. Sex education at the college level serves no purpose.

110. Health education at the college level is a waste of time.
40. There is nothing I can do to fight water pollution.

41. Curing a disease is more important than preventing it.

42. Sexual promiscuity is the expression of an unstable personality.

43. College marriages add but one more problem to an already frustrating time of life.

44. The impersonal atmosphere of college makes adjustment much more difficult.

45. One's respect for a fiancee will go down if they have sexual relations before they marry.

46. Chiropractic should be paid for under Medicare.

47. Adjustment to college is easy for most people.

48. I wish they would do more to publicize the dangers of drug abuse.

49. Healthy people exercise daily even though it may require careful planning of the work day.

50. Air pollution is inevitable.

51. Physical exercise for college students is ridiculous.

52. Sex education should not be taught in schools.

53. Facing reality means accepting responsibility.

54. Chronic drug users have mental problems.

55. Using someone else's medicine is all right if you know what the medicine is.

56. Family unity is the key to lowering the divorce rate in the United States.

57. Sex education should be as common as math or English.

58. People who engage in physical fitness programs are usually "health nuts."

59. People with good personalities have adjusted to life's problems.

60. A person should refrain from petting on a date because petting is a preliminary to sexual intimacy.

61. Abortion should be legalized without qualification.

62. People need ways to escape from reality.
## Scoring Key

**Olsen’s Health Attitude Inventory**

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APPENDIX B

PERMISSION LETTERS
APPENDIX C

FREQUENCY DISTRIBUTIONS
OF THE TEST SCORES
Table 6

Frequency Distribution of Pretest Scores of the Olsen's Health Attitude Inventory for Experimental and Control Populations

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Total 28 100.0
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Frequency Distribution of Pretest Scores of the Kilander-Leach Health Knowledge Test for Experimental and Control Populations

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Frequency Distribution of Posttest Scores of the Kilander-Leach Health Knowledge Test for Experimental and Control Populations

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