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The Effects of a Student Determined Curriculum Versus a Traditionally Determined Curriculum on the Health Interests and Cognitive Development in Health of College Students

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THE EFFECTS OF A STUDENT DETERMINED CURRICULUM VERSUS A TRADITIONALLY DETERMINED CURRICULUM ON THE HEALTH INTERESTS AND COGNITIVE DEVELOPMENT IN HEALTH OF COLLEGE STUDENTS

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CHAPTER I

THE PROBLEM

Introduction

The national bill for medical care in the United States was about 75 billion dollars in 1971, up nearly 11 percent from 1970.[1] But, these expenditures do not indicate that health care has increased commensurately or that the population of the United States is the healthiest on earth. In fact, the general health of Sweden and the Netherlands is commonly considered to be above that in the United States. Many reasons have been proposed to account for the lower health status of Americans, one of the most often mentioned being the lack of preventative health care. Preventative health care involves many facets, one of them being adequate programs of health education. The importance of health education, especially at the college level, was expressed by the American College Health Association in the following statement:

> Education is a vital part of an effective college health program. Such a program will influence the health of the individual student and his future family, the health of both faculty and staff and the proficiency with which they carry out their responsibilities and the health and health consciousness of the community in which the college is located.[2]

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[1]Hepner, James O. and Hepner, Donna M. The Health Strategy Game. St. Louis: C.V. Mosby Company, 1973, p. 90.

[2]American College Health Association. Recommended Standards and Practices for a College Health Program. Evanston, Illinois, 1967, Pp. 10-11.

Universities are currently experiencing decreasing enrollments and reductions in credit hours elected by full-time students. The total number of first-time, full-time freshmen on the nation's campuses was estimated at 1,558,000 for 1972, a decrease from 1971.[3] But, among the few academic areas in which there are gains in enrollment, one is the health professions. Some reasons given for a large portion of the decline in enrollments are rising costs, reduced financial support, deterioration of the labor market in many areas, and dissatisfaction with established programs.[4] A major part of the dissatisfaction with programs is claimed to be the lack of "relevance" in many classes that are taught by professors whom students believe have antiquated ideas. Part of the problem seems to be a need to humanize the curriculum or make the curriculum relevant to life. This means that material to be taught should be related to interests in an intimate way, or better yet, suggested by the students in order to satisfy an interest or felt need. Under such a plan a student wants to know because knowing is important to him. From the elementary grades through college, the curriculum in health education should be familiar to the students, with the content chosen because it is relevant, not simply because it has been established by tradition and may have some relationship to life. On the contrary, the health curriculum is an extension of, and has

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[3] Higher Education and National Affairs, XXII, 6, 1973, p. 4.

[4] Higher Education and National Affairs, XXII, 10, 1973, p. 7.

no end other than, those interests that are inherent in the students' process of living. This concept has been stated by other health educators as follows:

> We have said that health teaching, to be meaningful, must be based upon the needs and interests of the learner.[5]

To base a curriculum on the felt needs and interests of students means that the instructor must discover, not assume or estimate, those interests and needs. The best way to gather such information is to ask the learner himself. Who knows better what his interests and felt needs may be?

The alternative to a curriculum based on student interest is the "traditionally" determined curriculum in which a series of content areas, each related to some aspect of health, is included in the course. Sometimes the instructor perceives the content he presents as problems of social concern in which he has some special competence or special interest.

Researchers have often stated that interest is important to achievement. Mallinson and Crumrine[6] made such a claim as follows:

> It is axiomatic in the field of education that although interest in and of itself does not assure learning, there can be little or no learning without it.

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[5]Oberteuffer, Delbert, Hanelson, Orvis A. and Pollock, Marion B. School Health Education. New York: Harper & Row, Publishers, 1972, p. 54.

[6]Mallinson, George G. and Crumrine, William M. "An Investigation of the Stability of Interests of High School Students." The Journal of Educational Research, XLV, 1952, Pp. 369-383.

A major psychological factor in Dewey's thinking of the learning process was interest. In his system, interest served as the basic motivational construct. Interest, for Dewey, was the critical link between the pupil's present level of knowledge and that level the teacher wished the student to obtain.[7] For Dewey, interest was such an integral part of education that he wrote extensively on the nature of the relationship of interest to the educational effort.[8]

If satisfactory responses are to be made to student demands for interesting and relevant courses, then the need for further objective clarification of the role interest plays in achievement must be met. In so doing, professors and administrators may have a more powerful weapon in their armament of ideas to bolster declining enrollments in college classes.

During the past years, the literature dealing with interests and achievements has increased greatly. Some of these studies that are relevant to this investigation will be reviewed in the sections that follow.

Studies Related to Interest and Achievement

Educators have long maintained that "intrinsic" interest in the subject matter of a course stimulates greater attention and effort by the student. However, research on this topic has been

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[7]Dewey, John. Democracy and Education. New York: Macmillan Company, (paperback edition), 1961, p. 127.

[8]Dewey, John. Interest and Effort in Education. New York: Houghton-Mifflin Company, 1913, p. 101.

contradictory. Frandsen,[9] after reviewing seven studies concerning the relation of interests to achievement, in which scores on the Strong Vocational Interest Blank, or the Kuder Preference Record were compared with grades, concluded the following:

> All of these studies on the relation of interests to achievement, contrary to expectation on the hypothesis that interests are motives, show zero or very low relationships.[10]

Numerous other studies (Alson, 1953; Hake and Ruedisili, 1949; Miller, 1948)[11] have shown that interest alone has a low relationship, if any, to achievement in high school or college. A major constraint with these studies was the use of a standardized instrument, the Kuder Preference Record, to measure several general areas of interest (i.e., science) rather than using more specific interest inventories (i.e., chemistry or geology).

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[9]Frandsen, Arden N. "Appraisal of Interests in Guidance." Journal of Educational Research, XXXIX, 1945, Pp. 1-12.

[10]Ibid.

[11]Alson, Frank H. "A Study of Science Interests of Pupils in Grades Nine Through Twelve at Hillside High School, Durham, North Carolina." Unpublished Master's thesis, North Carolina College, Durham, North Carolina, 1953, p. 68;

Hake, D.T. and Ruedisili, C. H. "Predicting Subject Grades of Liberal Arts Freshmen with the Kuder Preference Record." Journal of Applied Psychology, XXXIII, 1949, Pp. 553-558;

Miller, A.D. "Role of Kuder Interest in Prediction of Course Marks of Freshmen Engineering Students." Unpublished Master's thesis, Iowa State College, Ames, Iowa, 1948, p. 57.

> Various devices are in use for determining interests. Outstanding among these are the 'Strong Vocational Interest Blanks' and the 'Kuder Preference Record'. These inventories offer us an opportunity to determine general interest patterns but are limited in value if they are to be used to locate specific interests within a single subject area.[12]

Others have attempted to rationalize the paradox of interest and achievement with the hypothesis that a potentially demonstrable relationship between interests and achievement is often masked by extrinsic motives such as social approval, grade point domination, or future occupational considerations.

On the other hand, several studies (Barrilleaux, 1961; Edwards and Wilson, 1959; Frandsen and Session, 1953; Thorndike, 1944)[13] have found that students have higher achievement in the subjects in which they express more interest than in those subjects in which they express less interest.

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[12]Leader, William. "The Stimulation of Science Interests and Their Use in Curriculum Construction." Science Education, XXXXII, 1958, p. 444.

[13]Barrilleaux, Louis E. "High School Science Achievement as Related to Interest and I.Q." Educational and Psychological Measurements, XXI, 1961, Pp. 929-936;

Edwards, T. Bentley and Wilson, Alan B. "The Association Between Interest and Achievement in High School Chemistry." Educational and Psychological Measurements, XIX, 1959, Pp. 601-610;

Frandsen, Arden N. and Session, Alwyn D. "Interests and School Achievement." Educational and Psychological Measurements, XII, 1953, Pp. 94-101;

Thorndike, E.L. "Interests and Abilities." Journal of Applied Psychology, XXVIII, 1944, Pp. 43-52.

Studies Related to the Stability of Interests

If one is to use interests as a means to an end namely, the development of a student-oriented curriculum, then it would be well to know if a curriculum so developed would be stable. A way to examine this aspect would be to look at the stability of interests.

In 1939, Ruffner[14] attempted to measure pupils' interests in general science, and to measure interest changes over a definite period of time. She found that interests in most areas of science were stable and permanent. Zim[15] published a report in 1940 that dealt with part of an earlier study in 1934 undertaken by the Progressive Education Association. The study was designed to investigate the science interests of adolescents. He concluded that interests seemed to change gradually with age during the adolescent period, but that the interests were permanent enough to warrant their use in curriculum construction.

Another investigation of the stability of scientific interest was that of Stoops[16] who found a correlation coefficient of .85 for boys and .70 for girls on the Scientific Scale of the Kuder Preference Record between scores obtained from the administration of Form A and Form B in grades nine and eleven. In another study

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[14]Ruffner, Frances E. "Interests of Ninth Grade Students in General Science." Unpublished Master's thesis, The University of Buffalo, Buffalo, N.Y., 1939, p. 52.

[15]Zim, Herbert S. Science Interests and Activities of Adolescents. New York: Ethical Culture Schools, 1940.

[16]Stoops, John A. "Stability of the Measured Interests of High School Pupils Between Grades Nine and Eleven." Educational Outlook, XXVII, 1953, Pp. 116-118.

reported, Chase,[17] in 1950, concluded that science interests of secondary school students were rather stable. Mallinson and Van Dragt[18] administered the Kuder Preference Record to 240 students at both the ninth and twelfth grade levels and concluded that prediction of senior interests from freshmen interests was relatively valid. Scientific interests, relative to other interests measured, increased for 112 students, decreased for 115, and showed no change for 13 students. Of 29 students who ranked scientific interest first at the ninth grade level, only 13 continued to rank this interest first at the twelfth grade level. While this may seem contradictory, the stability was not in rank order of scores, but in terms of interpreting the test results. If a score on a certain subtest for interest was above a criterion level, then its specific rank became inconsequential. For example, if the scores on the science, mathematics and social science subtest all were above the criterion level, the interpretation of the test was the same without regard for the relative ranks of the three scores. On this basis there was consequential stability.

Craig and Holsbach[19] developed a unique investigation of junior-high-school science interests. Using an instrument that had pre-

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[17]Chase, John B. "An Analysis of the Change of Interests of One Hundred and Fifty Secondary School Pupils." Unpublished Master's thesis, The University of North Carolina, Chapel Hill, North Carolina, 1950, p. 68.

[18]Mallinson, George G. and Van Dragt, Harold. "Stability of High School Students' Interest in Science and in Mathematics." School Review, LX, 1952, Pp. 362-367.

[19]Craig, Robert C. and Holsbach, Sister M. Celestine. "Utilizing Existing Interests to Develop Others in General Science Classes." School Science and Mathematics, LXIV, 1964, Pp. 120-128.

viously been computed to have a coefficient of correlation of .55 with the science interest section of the Kuder Preference Record, the authors identified students with high interest and low interests in five science areas. They then gave various supplementary activities that the student had previously designated as "liked" or "disliked" in science to the high science and low science groups and again administered the interest inventory at the end of the year. Their findings were these:

(1) The low science interest subgroup (pretest) gained significantly ($p < .05$) in science interest in all five areas of science when given activities they "liked" to do in science. The high interest subgroup (pretest) gained significantly ($p < .05$) in one (Earth Science) of the five designated science areas when given activities they "liked" to do in science.

(2) When the high science interest subgroup (pretest) was given activities they "disliked" the gain in science was significant in one of the five designated science categories (Living Things). The low interest subgroup did not participate in this type of experience.

(3) When special activities were not given to either low or high interest (pretest) subgroups the low interest subgroup had significant gains in scientific interest in two of the five science areas and the high interest subgroup gained in one (Earth) of the five designated science categories.

The authors concluded that people with high interests in a subject area may require some unique approach to the area in which they already have a high interest. Another important conclusion was that in some cases active attempts to change the interests of students by manipulating their experiences are feasible ventures.

With a sample of 325 high school students, Wynn and Bledsoe[20] using the Kuder Preference Record, failed to find significant difference between the mean "Scientific Interest" scores of students tested at the ninth-grade level and again at the eleventh-grade or twelfth-grade level.

The only two studies which the investigator could locate that dealt directly with the stability of interests in health were Garrett and Prangle[21] and Pepin.[22] Garrett and Prangle's study was based on an investigation Prangle had previously conducted in 1959 in which 457 students were asked to rank their top three choices of interest in seventeen areas of health instruction. In the 1964 study, 107 students responded in the following way compared with the top six areas of the seventeen items in 1959:

Area of Interest	1959 Rank	1964 Rank
Emotional Health	1	1
Heredity	2	3
Family Living	3	2
Personal Health	4	4
Depressants/Stimulants	5	5
Exercise and Rest	6	6

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[20]Wynn, Dan C. and Bledsoe, Joseph C. "Factors Related to Gain and Loss of Scientific Interest During High School." Science Education, L, 1967, Pp. 67-74.

[21]Garrett, Leon and Prangle, Roy. "Health Interests After Five Years." The Journal of School Health, XXXVI, 1966, Pp. 42-43.

[22]Pepin, Jean-Guy. "Health Interests of 2,552 Secondary School Students of La Commission des Ecoles Catholiques de Montreal." Unpublished Doctor's dissertation, University of Oregon, Eugene, Oregon, 1972, p. 270.

The authors made the following conclusion:

> Over the five year period 1959-1964 health interests at their college were relatively stable.

Pepin found that of the health interests of high-school students measured ten years previously that were also measurable by his instrument, there was an 80 percent agreement with the interest categories on his inventory.

Studies Related to Health Education Interests

In 1929, Turner[23] using three groups of teachers, prepared a list of grade levels of what appeared to be childrens' natural interests in health. Included in the list of 53 natural interests were babies, cooking, exercise, games, music, play, radio and sewing. This type of study to identify student interests in health was extended to research investigations of health interests.

The early studies (Oberteuffer, 1927; Rooks, 1953; Hayes, 1940)[24] of health interests indicated a common core of interests

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[23]Turner, C.E. "Incentives and Interests in Health." Journal of Education, 110, 1929, Pp. 37-39.

[24]Oberteuffer, Delbert. "Interests of College Freshmen in Hygiene." Nation's Health, IX, 1927, Pp. 48-49.

Rooks, Roland. "The College Freshmens' Knowledge of and Interest in Personal Hygiene." Research Quarterly, VI, 1935, Pp. 51-80;

Hayes, Richard F. "The Construction of a Course in Health Education for Secondary Schools." Education, LXI, 1940, Pp. 216-220;

existed namely, sex hygiene, personal care, exercise, and physical fitness.

Ten years later, Byrd[25] compiled a list of 300 health problems from more than 10,000 public health and scientific articles appearing in various types of medical and allied health journals. He advocated the use of these problems in the exploration of health interests.

Lantagne[26] used Byrd's list to determine health interests in three studies. The areas of greatest interest designated by the students were habit-forming drugs, family health, mental health, and exercise. In his first study, Lantagne found that males and females had a common core of health interests. In his second and third studies he found 80 percent and 90 percent respectively of the interests of males and females were the same. His findings were consistent with those of a previous study by Southworth, Latimer

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[25]Byrd, Oliver E. "Health Problems of Significance for Course and Curriculum Construction." Research Quarterly, XXX, 1950, Pp. 3-10.

[26]Lantagne, Joseph E. "Analysis of the Health Interests of 3,000 Secondary School Students." Research Quarterly, XXI, 1950, Pp. 34-39.

_____. "An Analysis of Health Interests of 1,000 Junior College Students in California." Junior College Journal, XXI, 1951, Pp. 429-443.

_____. "Health Interests of 10,000 Secondary School Students." Research Quarterly, XXIII, 1952, Pp. 330-346.

and Turner.[27] However, Lantagne still concluded that because there were some differences between the health interests of the two sexes the sexes should possibly be separated for health instruction. Orr[28] in 1965 also reported that male and female high school seniors had a common core of health interests. However, studies by Kilander[29] and by Campbell and Early[30] tend to support the belief that females have better health knowledge than males.

Factors other than sex differences that were examined as being related to common health interests included socio-economic background, age, and racial differences. Byler[31] reporting on the Connecticut Study, indicated that there were basic health interest areas common to all students, without regard for their socio-economic environments. Also, Archer[32] found a common core of health

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[27]Southworth, Warren H., Latimer, Jean V. and Turner, Clair E. "A Study of the Health Practices, Knowledge, Attitudes and Interests of Senior High School Pupils." Research Quarterly, XV, 1944, Pp. 118-136.

[28]Orr, Oscar P. "An Evaluation of Health Interests and Health Education Needs as Basic Premises in Selecting Health Content in the Secondary Schools of Knoxville, Tennnessee." Unpublished Doctor's dissertation, University of Tennessee, Knoxville, Tennessee, 1965, p. 180.

[29]Kilander, H. Frederick. "Health Knowledge of High School and College Students." Research Quarterly, VIII, 1937, Pp. 3-32.

[30]Campbell, D. E. and Early, R.G. "Comparison of Health Knowledge of Young Adults and Their Parents." Research Quarterly, XL, 1969, Pp. 676-681.

[31]Byler, Ruth V. "Teach Us What We Want to Know." The Journal of School Health, XL, 1970, Pp. 252-255.

[32]Archer, Sara K. "An Identification of the Relationship Between Certain Characteristics of Well Older People to Their Patterns of Interest in Health Education Content Areas." Unpublished Doctor's dissertation, Boston University, Boston, Massachusetts, 1971, p. 338.

interests in a group of senior citizens age 65 and over. Harnett[33] examined a group of junior-high-school students and reported a coefficient of correlation of .90 for common health interests of black and white students. The lowest coefficient of correlation he reported in health interests was for the subgroups of males and females.

Several studies reported that there were major differences between male and female health interests. The earlier studies such as the Denver study[34] and its ten year follow-up study,[35] together with a study reported by Ramsdell[36] indicated that personal health problems were of major interest to the students. Topics such as personality, mental health, family health, and drugs were of major interest to the students. Also, Pepin,[37] Schaller,[38] and Dowell[39]

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[33]Harnett, Arthur L. "Health Needs and Interests of Junior High School Students." The Journal of School Health, XXXVII, 1967, Pp. 190-191.

[34]Denver Public Schools. Health Interests of Children. (Revised edition; Denver, Colorado: Board of Education), 1954, Pp. 1-121.

[35]Corliss, Leland M. "A Report of the Denver Research Project on Health Interests of Children." The Journal of School Health, XXXII, 1962, Pp. 355-360.

[36]Ramsdell, Les C. "An Analysis of the Health Interests and Needs of West Virginia High School Students--A Report." The Journal of School Health, XLII, 1972, Pp. 477-480.

[37]Pepin, op. cit.

[38]Schaller, Warren E. "Health Needs and Interests as a Basis for Selecting Health Content in Secondary Schools." Research Quarterly, XLI, 1960, Pp. 512-521.

[39]Dowell, Linus J. "A Study of Selected Health Education Implications." Research Quarterly, XXXVII, 1966, Pp. 23-31.

found a wide range of health interests in both boys and girls, with significant differences between health interests of the two sexes. Dowell concluded that girls were generally more interested in health than boys. They found that physical fitness and exercise, drugs, heredity, and human sexuality were the topics selected by the students as areas of greatest health interests.

However, Engs,[40] in 1970, found that community health interests rather than personal health interests were the primary health interests of college students. Areas such as environmental pollution (air, water and the population explosion), sex education, and warfare (atomic, biological and chemical) were at the top of the health interest list. A middle ground between personal and community health interests was identified by the students in Lussier's[41] study. In his study, he found that mental health, human sexuality and environmental education were leading interests in the area of health.

Public health interests of college students were investigated by Stiles and Watson[42] and by Williams and Southworth.[43] Stiles

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[40]Engs, Ruth C. "The Health Concerns of College Students Enrolled in the Spring Term, 1970, Personal Health Course at the University of Oregon." Unpublished Master's thesis, University of Oregon, Eugene, Oregon, 1970, p. 76.

[41]Lussier, Richard R. "Health Education and Student Needs." The Journal of School Health, XLII, 1972, Pp. 477-480.

[42]Stiles, William M. and Watson, Lois C. "Public Health Interests of College Students." The Journal of School Health, XXV, 1955, Pp. 224-228.

[43]Williams, Helen L. and Southworth, Warren H. "Stimulating Interest in Public Health Problems Among High School Pupils."" Journal of Educational Research, LIII, 1959, Pp. 53-61.

and Watson reported that interest in public health did not change after a course designed to increase interest in public health, while Williams and Southworth reported the opposite.

Veenker and Ismail[44] determined the relative effectiveness of three different approaches to health instruction at the college level. Each of three groups of students were taught by different instructional approaches namely, problem solving, lecture, and discussion. Using a standardized health test and an interest checklist, the authors found that significant gains in health knowledge were evidenced by all three groups using the different methods. Significant differences in health knowledge were not detected among the three groups. Significant increases in health interests were detected in only two of the classes, the lecture and discussion approaches.

Others who identified areas of health interests were Whitely,[45] Prangle,[46] Breen,[47] and Kime.[48] Kime used developmental tasks and

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[44]Veenker, C.H. and Ismail, A.H. "Effectiveness of Three Approaches to College Health Instruction." Research Quarterly, XXXIII, 1962, Pp. 129-135.

[45]Whitely, William E.R. "Health Interests of Selected College Students." Unpublished Doctor's dissertation, Indiana University, Bloomington, Indiana, 1957, p. 149.

[46]Prangle, Roy. "Health Interests and a Method of Appraisal." The Journal of School Health, XXIX, 1959, Pp. 12-14.

[47]Breen, M. "The Relationship Between Student Health Instruction and Content of a University Required Health Education Course." Unpublished Master's thesis, University of Oregon, Eugene, Oregon, 1968, p. 98.

[48]Kime, Robert E. "Feasibility of Using Developmental Tasks as a Source of Health Interests." Research Quarterly, XXXVI, 1965, Pp. 38-45.

general health questions to study their relative abilities to elicit health interests of students.

In light of the information presented in this chapter, it was believed that there was a need to investigate the relationship between student interest oriented curricula and student achievement. A search of the literature failed to reveal any attempt to measure the health knowledge achieved by students who completed a course in health based on their interests and if such achievement would be significantly different from student achievement after a traditional curriculum in the same course. Consequently, this study was undertaken.

PURPOSE

It is the purpose of this study to measure (1) the general health knowledge of college students, (2) assess their interests in various areas of health, and (3) determine if there are significant gains in these areas after a formal course in health using student health interest in one course and a traditional curriculum in the other course, as measured by pre- and post-testing techniques. From the data collected, it was hoped that answers might be elicited to the following questions:

(1) What are the health interests of college students?

(2) Is there a significant difference between the health interests of male and female college students?

(3) Is there a significant difference between the achievements in health knowledge of male college students and female college students?

(4) Is there a significant gain in achievement of students taught by use of a curriculum based on student health interests and felt needs?

(5) Is there a significant gain in achievement of students taught by use of a traditionally determined curriculum?

(6) Is there a significant difference between the achievements of students taught by a curriculum based on student health interests and felt needs and those taught by a traditionally determined curriculum?

(7) Is there a significant gain in health interests of students taught by use of a curriculum based on student health interests and felt needs?

(8) Is there a significant gain in health interests of students taught by use of a traditionally determined curriculum?

(9) Is there a significant difference between health interests of students taught through a curriculum based on student health interests and felt needs and those taught by a traditionally determined curriculum?

CHAPTER II

RESEARCH DESIGN AND METHODOLOGY

The purposes of this chapter are to describe the (1) pilot study; (2) procedures utilized in gaining information; (3) instrumentation; (4) course content and characterize the population; and (5) research design in the analysis of the data.

Pilot Study

A group of 30 undergraduate college students, from freshmen through seniors, were used to test the instruments prepared for the final study. The pilot group included 13 females and 17 males. The standardized health knowledge test, Health Behavior Inventory (College Level),[49] was administered the first day of classes. One class period of 50 minutes was found to be satisfactory but the students were allowed a full 60 minutes.

During the second class period, the pilot group was administered the second instrument, "Health Interest Questionnaire",[50] that was designed to measure health interests in health subject topics. The instrument was completed by the group without difficulty in 15 minutes. After the completion of the inventory, several students questioned the use of "extremely concerned, very concerned, moderately concerned, mildly concerned, not concerned" as categories if the

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[49] See Appendix A

[50] See Appendix B

instrument was designed to measure health interests. A vote was taken immediately by the class members for their opinions on the wording of the inventory. Twenty-one of the 25 students voted to change the wording "concerned" to "interested". The change was incorporated into the health interest inventory.

The health interest inventory was open-ended so that any topics not included on the inventory but which the students thought were of interest could be added. Only four topics were added, namely allergies, abortion, early history of health, and asthma. It was decided by the investigator to include all four topics with the idea that the four topics were of interest to the students at the university in which the study was conducted. No other problem arose with, nor did changes seem necessary to, the instruments for use in the present study.

Procedures

The study was undertaken during the Winter (second) Semester 1973 at Western Michigan University (WMU) with students enrolled in two sections of the course Healthful Living (111) offering two semester hours of undergraduate credit. The sections met two days per week on Tuesday and Thursday for 50 minutes each day. One of the sections met at 1:00 p.m. and the other at 2:00 p.m.

The first day of class the students in both sections were administered the Health Behavior Inventory (College Level) as a pretest of their general health knowledge. Responses were made on an IBM 1230 type, No. 5564 answer sheet. The students were asked

to complete the identifying information at the top of the sheet using social security numbers. The instructions on the test cover and on page three of the test booklet were read to the class aloud as they read the instructions silently. The students were allowed 50 minutes to answer the questions on the Health Behavior Inventory. During the second class period the students were instructed to fill out the "Health Interest Questionnaire" as a pretest of their health interests. They were informed that this information would be used the next fall for determining the curriculum of a new health course. Also, during the second class period, the students completed a "Background Questionnaire"[51] that provided data for a profile of the different backgrounds of the students in both classes.

An analysis of the interests in each health class was made and the score for each topic on the health interest inventory was ranked from highest to lowest. A flip of a coin was used to determine which section would have the curriculum based on health interests as determined by the health interest inventory and which would have the "traditional curriculum." As a result the 1:00 class used the traditional curriculum and the 2:00 class the curriculum based on student health interests. Traditional curriculum is used herein to mean hose content areas that are most often emphasized by required college health courses as synthesized by Braza[52] in 1969.

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[51]See Appendix C

[52]Braza, Gerald F. "The Status and Administration of the Required Health Education Courses, A Resume." The Journal of School Health, XLI, 1971, p. 142.

The areas he found to be most often emphasized were alcohol, drugs, narcotics, mental health, personal adjustment, preparation for marriage, smoking, non-communicable disease, and parenthood and child care. The investigator decided to use the ten highest ranked items of the "Health Interest Inventory" and as many other items in the top half of the ranked interests that were related to the first ten to make a coherent curriculum. Appendix D contains outlines of the two curricula that were distributed to the classes during the third class period.

The courses were taught by the lecture method in which extensive audio-visual materials were used in both sections. A new text[53] was selected which covered a wide range of material since the selection of the text had to be made several months before the students had a chance to designate their health interests. Both sections used the same text.

During the last week of the Winter Semester, the Health Behavior Inventory, "Health Interest Questionnaire," and "The Student Evaluation of Biology Courses"[54] were administered. The Health Behavior Inventory and the "Health Interest Questionnaire" were administered to the classes on successive days as posttests. The "Health Interest Questionnaire" and "The Student Evaluation of Biology Courses" that enabled the students to rate their instructor were both administered on the same day.

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[53]LaPlace, John. Health. New York: Appleton-Century-Crofts, 1972, p. 720.

[54]See Appendix E.

The first instrument used by the author for gathering data was the Health Behavior Inventory (College Level).[55] This general health knowledge test was selected from the health tests listed in The Seventh Mental Measurements Yearbook,[56] because it seemed to meet the certain criteria better than other tests that were listed. These criteria were broad spectrum objective general health knowledge items, college level, and recently developed or revised.

The instrument consisted of sixteen health problems or topics that have multiple-choice responses concerning these problems. It contains 70 multiple-choice items. Each item has only one correct response which the student has to select from four possible alternatives. The test was developed by Reid for her dissertation submitted to the University of California in 1956. Since that time it has undergone several revisions and was finally published by McGraw-Hill Book Company in 1966.

The reliability coefficients of the test were computed by using Kuder-Richardson formulaes 20 and 21. Data were obtained from the administration of the test to some 2,500 students. The reliability coefficients appear in Table 2-1.[57]

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[55] op. cit.

[56] Buros, Oscar K. (Ed.) The Seventh Mental Measurements Yearbook. Monterey, California: California Test Bureau/McGraw-Hill Book Company, 1966, p. 9.

[57] Reid, Carmen P. and Johns, Edward B. Health Behavior Inventory Manual. Monterey, California: California Test Bureau/McGraw-Hill Book Company, 1966, p. 9.

TABLE 2-1

Reliability Coefficients and Related Data for Males, Females and Total Group in Standardization Program

	N	Mean	S.D.	S.F. Meas.	KR 20	KR 21
Males	1391	35.92	7.55	4.11	---	.70
Females	1155	38.08	6.52	4.12	---	.60
Total	2546	36.90	7.18	4.12	.70	.67

The validity of the Health Behavior Inventory was determined in several ways. Content validity was used in the original construction by asking qualified experts in the area of health to rate the test items. Two measures of concurrent validity were also obtained. The first was by computing coefficients of correlation between the test scores (pre-instruction) of students and their class marks. The resulting n was .56. Secondly, a coefficient of correlation was computed between scores on the health test and those on another similar standardized health test (Health Education Knowledge Inventory). This effort yielded a coefficient of .53 (pre-instruction).[58]

The second instrument used by the author was the "Health Interest Questionnaire."[59] This instrument was a modification of the "Health Concern Questionnaire" developed by Engs[60] for use in a beginning health course at the University of Oregon. The titles of the summated rating-type scale were changed from "concerned" to "interested" at the suggestion of the students in the pilot study. Also, as indicated earlier, four items of interest to students in the pilot study were added. The same type of scaling was used as in the original questionnaire: "Extremely Interested" was assigned five points decreasing to one point for "Not Interested"

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[58] Ibid.

[59] See Appendix B.

[60] Engs, op. cit.

as listed below:

Degree of Interest	Assigned Weight
Extremely Interested	5
Very Interested	4
Moderately Interested	3
Mildly Interested	2
Not Interested	1

The Summated Rating-type scale was used because it allows for different intensities of interests about a particular item. It is considered to be an easy test to construct, administer, and score, and has been found to be highly reliable.[61]

The reliability of the original instrument was tested by Engs using results from 30 questionnaires. She used the split-half method in which a product moment coefficient of correlation corrected with the Spearman-Brown formula was computed between the score on the odd items on the Health Concern Questionnaire and that on the even items of the questionnaire. The computation yielded a value of .88.

The same procedure as the aforementioned was used to establish the reliability of the new instrument, "Health Interest Questionnaire," that had been altered slightly by the addition of four new health items, as suggested by the students in the pilot study. A flip of the coin determined that the pretest answers of the traditional curriculum class (1:00 class) would be used to establish reliability. A product-moment coefficient of correlation corrected with the Spearman-Brown formula yielded a reliability coefficient of .94. This value for a coefficient of correlation is considered to be high. The data and compuations are found in Table 2-2.

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[61]Engs, op. cit., p. 23.

TABLE 2-2

Reliability Data: Pretest Scores on the Health Interest Questionnaire By the Traditional Curriculum Class

Individual	Odd Items (X)	Even Items (Y)	XY	X^2	Y^2
1	84	76	6384	7056	5776
2	80	92	7360	6400	8464
3	104	107	11128	10816	11449
4	71	75	5325	5041	5625
5	76	81	6156	5776	6561
6	93	100	9300	8649	10000
7	81	78	6318	6561	6084
8	91	90	8190	8281	8100
9	106	114	12084	11236	12996
10	99	100	9900	9801	10000
11	98	89	8722	9604	7921
12	107	112	11984	11449	12544
13	82	83	6806	6724	6889
14	111	106	11766	12321	11236
15	71	80	5680	5041	6400
16	80	66	5280	6400	4356
17	74	88	6512	5476	7744
18	69	65	4485	4761	4225
19	82	73	5986	6724	5329
20	67	70	4690	4489	4900
21	96	85	8160	9216	7225
22	80	81	6480	6400	6561
23	84	95	7980	7056	9025
24	86	91	7826	7396	8281
25	88	90	7920	7744	8100
26	74	81	5994	5476	6561
27	86	93	7998	7396	8649
28	51	53	2703	2601	2809
29	107	116	12412	11449	13456
30	87	97	8439	7569	9409
N=30	2565	2627	229968	224909	236675

Continued.....

TABLE 2-2

(Continued)

$$r_{1/2} = \frac{XY - \frac{(X)(Y)}{N}}{\sqrt{X^2 - \frac{(X)^2}{N}\ Y^2 - \frac{(Y)^2}{N}}} = \frac{229968 - \frac{(2565)(2627)}{30}}{\sqrt{(224909 - \frac{2565}{30})(236675 - \frac{2627}{30}}}$$

Spearman-Brown prophecy formula:

$$r = \frac{2r_{1/2}}{1 + r_{1/2}} = \frac{2(.88)}{1 + .88} = .94$$

The validity of the original questionnaire was determined by a method called Internal Consistency Validation. This technique involved determining the coefficient of correlation between the scores for each item against the total score on the entire list, minus the score for that particular item. Computations for all 50 items reached the required .208 internal consistency value necessary for significance at the .01 level of confidence. Since each item was used for deriving the validity of the original instrument and since only four items had been added to the questionnaire, it was thought that further statistical validation was unnecessary. The four items added were based on student expressed interest and so it was thought that face validity would be sufficient, especially since the instrument had increased in reliability.

The third instrument used was the "Student Evaluation of Biology Courses" that had been developed by a committee of faculty members of the Biology Department, Western Michigan University. The instrument had been designed to help faculty members evaluate themselves and not as part of a merit pay system. This was the reason the instrument was lengthy (56 questions). Because the instrument was used for all biology courses, responses to certain sections of the instrument were not tabulated, especially those concerned with a laboratory and the laboratory instructor.

The Sample

The subjects included in this sample consisted of students in health-education minors since Western Michigan University does not

offer a major and students who were electing the course for General Studies requirements. The subjects were randomly assigned to the course by the instructor since permission of the instructor was required for enrollment in the class. Only three students objected to their random assignments in the sections and subsequently did not enroll. Two classes of 30 students resulted.

Because of the great diversity of other majors and minors of the students in the classes, no particular grouping was investigated statistically. For example, the course was designed primarily for students minoring in health-education although only five students in each class were health-education minors. Table 2-3 on page 31 describes certain elements of the student backgrounds.

Analysis and Statistical Techniques

A variety of statistical treatments were used in this study to determine the extent of the relationships between the independent and dependent variables. Since this study attempts to provide answers to a number of questions, it was necessary to use different analyses to accomodate the measurements of the variables. The types of treatments included simple ranking of interest items, two-factor analysis of variance with repeated measures on one factor, unbalanced two-way analysis of variance, and *t*-tests. The exact probabilities of observing reported differences by chance alone are reported as "p" levels. The analyses of the data appear in the following chapter.

The data were analyzed with appropriate computer programs using the DEC PDP 10 System computer at Western Michigan University.

TABLE 2-3

Background Information of Students in Healthful Living (111) Winter Semester, 1973

Characteristics	Number in One O'Clock Class (Traditional)	Number in Two O'Clock Class (Interest Class)
Males	14	18
Females	16	12
Seniors	8	13
Juniors	15	12
Sophomores	5	2
Freshmen	2	3
High Grade Point Average*	8	13
Middle Grade Point Average*	12	10
Low Grade Point Average*	10	7
High Number of Semesters in Science**	13	14
Low Number of Semesters in Science**	17	16
Minority Students		
Black	2	3
Oriental	1	0
TOTAL	30	30

*High grade point average $\geq$ 3.00 on a 4.00 scale; middle grade point average $\geq$ 2.50 $<$ 3.00; low grade point average $\leq$ 2.50.

**Science is based on total number of semesters of science reported for high school and college. High science $>$ 10 semesters of science; low science $\leq$ 10 semesters of science.

Data card formats were developed to incorporate all data solicited from the students in the two health classes. The information was subsequently converted to punched cards. The information on the cards was validated by comparing the printout of the cards with the code sheets. Cards in error were repunched. The data were then stored on disc tapes of the computer for later statistical treatment.

CHAPTER III

ANALYSIS OF THE DATA

Introduction

The purpose of this chapter is to describe the statistical treatments that were used, and the data that were collected.

The main statistical treatment of the data involved the two-way analysis of variance. Where appropriate, either the two-factor analysis of variance with repeated measures on one factor[62] or the unbalanced two-way analysis of variance were used.[63] For all F values calculated, appropriate t-tests were also derived. The probability level of these values for both F and t were considered to be significant at the $p < .05$. The relationships between ranked interests of males and females were determined with Kendall's tau coefficient of correlation.[64] The dependent variables used in the analyses were student interest determined health curriculum and a traditional health curriculum. The independent variables investigated were general health knowledge and general health interests. Both knowledge and interests

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[62]Winer, B. Statistical Principles in Experimental Design: 2nd Ed. New York: McGraw-Hill, 1971, p. 518.

[63]Bancroft, T.A. Topics in Intermediate Statistical Methods: Vol. I. Ames, Iowa: Iowa State University Press, 1968, Pp. 24-30.

[64]Glass, Gene V. and Stanley, Julian C. Statistical Methods in Education and Psychology. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970, Pp. 176-179.

were compared before and after the course for students having low, middle, or high grade-point averages; on the basis of sex; and with respect to extent of science background. Students with high grade-point averages were defined as those having 3.00 or greater on a 4.00 scale. Students with middle grade-point averages were those with grade point averages from 2.50 to 2.99, and students with low grade-point averages, those who fell below 2.50. A "high" science student was defined, for the purposes of this study, as one who had enrolled in at least 11 semesters of science in high school and college whereas "low" science students were those with less than 11 total semester hours of science. Semesters of science in which students were currently enrolled were counted as part of the background.

Analyses Related to Main Questions

The main questions to which answers were sought in this study and the data collected with the interpretations are as follows:

1. What are the health interests of college students?

From responses to the "Health Interest Questionnaire," the investigator ranked the interests of the class whose health curriculum was based on interests. The ranking was based on weighted scores that were the numbers of responses for each level of interest times the value of the interest. The values for the various levels of interest and the assigned weights are listed below.

Degree of Interest	Assigned Weight
Extremely Interested	5
Very Interested	4
Moderately Interested	3
Mildly Interested	2
Not Interested	1

It was found that topics of much concern to health educators were also of concern to college students. Among the ten highest interests were cancer, heart disease, mental health, and venereal disease. Topics of current national concern were also among the top interests, including drugs, water pollution, and air pollution. Six of the top fifteen items dealt with various aspects of human sexuality which indicated that this general area of health is of greatest interest to college-age students. The ranking of the data appears in Table 3-1 on page 36.

2. Is there a significant difference between the health interests of male and female college students?

Both males and females were very interested in the general area of human sexuality, cancer and heart disease. Females were more interested than males in the areas of mental health, nervousness, death and suicide. Males were more interested than females in air pollution, water pollution and drug abuse.

A comparison of the two sets of ranked data was made with the Kendall tau coefficient of correlation. This technique yielded a coefficient of correlation of .63. As may be seen in Tables 3-2, 3-3, 3-4 on pages 37-40,there are great differences between the health interests of males and females.

The scores of the female subjects in both sections of Healthful Living were treated as one group and pretest health interests were calculated using the weighted score technique described previously.

TABLE 3-1

Analysis of Rankings of Pretest Health Interests of the Health Interest Curriculum Class

Topic	Weighted Scores	Topic	Weighted Scores
1. Cancer	113	30. Sterility	96
2. Drug Abuse	121	31. Moodiness	96
3. Venereal Disease	121	32. Emphysema or Respiratory Disease	95
4. Pregnancy	119	33. Kidney Disease	92
5. Heart Disease	118	34. Liver Disease	92
6. Smoking and Disease	118	35. Auto Accidents	90
7. Abortion	116	36. Allergies	89
8. Water Pollution	113	37. Atomic Warfare	89
9. Mental Health	112	38. Drowning	89
10. Birth Control	112	39. Radiation	88
11. Air Pollution	111	40. Biological and Chemical Warfare	88
12. Child Birth	111	41. Homosexuality	87
13. Death	108	42. Accidents due to Electric Current	86
14. Alcohol Dependence	108	43. Vietnam Combat	85
15. Sex Behavior	107	44. Acne	83
16. Eye Disorders and Blindness	106	45. Airplane Accidents	82
17. Starvation and Malnutrition	105	46. Nausea	82
18. Use of Contraceptives	105	47. Masturbation	81
19. Headaches	105	48. Halitosis or Body Odor	80
20. Nervousness	105	49. Asthma	79
21. Suicide	105	50. Poisoning by Snakes	77
22. Aging	105	51. Riots	77
23. Population Explosion	104	52. Varicose Veins	76
24. Poor Teeth and Decay	103	53. Firearm Accidents	75
25. Overweight	98	54. Early History of Health	72
26. Being Burned	98		
27. Tuberculosis	97		
28. Mononucleosis	97		
29. Colds	96		

TABLE 3-2

Analysis of Rankings of Pretest Interests in Health of Males
Who Were Enrolled in Healthful Living

Topic	Weighted Scores	Topic	Weighted Scores
1. Cancer	124	29. Colds	101
2. Smoking and Disease	124	30. Homosexuality	101
3. Abortion	123	31. Auto Accidents	98
4. Venereal Disease	123	32. Masturbation	97
5. Birth Control	121	33. Allergies	96
6. Drug Abuse	120	34. Liver Diseases	96
7. Use of Contraceptives	116	35. Moodiness	96
8. Water Pollution	116	36. Kidney Disease	95
9. Air Pollution	115	37. Drowning	94
10. Alcohol Dependence	114	38. Tuberculosis	94
11. Sex Behavior	114	39. Emphysema or Respiratory Disease	92
12. Child Birth	112	40. Accidents due to Electric Current	91
13. Death	112	41. Vietnam Combat	91
14. Heart Disease	111	42. Riots	90
15. Pregnancy	111	43. Airplane Accidents	90
16. Poor Teeth and Decay	109	44. Atomic Warfare	89
17. Sterility	108	45. Poisoning by Snakes	89
18. Population Explosion	108	46. Varicose Veins	89
19. Mental Health	107	47. Asthma	88
20. Aging	106	48. Acne	87
21. Headaches	106	49. Being Burned	87
22. Eye Disorders and Blindness	105	50. Radiation	87
23. Suicide	105	51. Nausea	85
24. Mononucoelosis	103	52. Halitosis or Body Odor	84
25. Nervousness	103	53. Firearm Accidents	79
26. Overweight	103	54. Early History of Health	73
27. Biological and Chemical Warfare	102		
28. Starvation and Malnutrition	102		

TABLE 3-3

Analysis of Ranking of Pretest Interests in Health of Females
Who Were Enrolled in Healthful Living

Topic	Weighted Scores	Topic	Weighted Scores
1. Cancer	123	29. Biological and Chemical Warfare	93
2. Mental Health	113	30. Liver Diseases	93
3. Birth Control	111	31. Colds	92
4. Child Birth	111	32. Sterility	92
5. Venereal Disease	111	33. Radiation	90
6. Death	106	34. Being Burned	87
7. Nervousness	106	35. Air Pollution	86
8. Sex Behavior	106	36. Atomic Warfare	84
9. Use of Contraceptives	105	37. Drowning	84
10. Pregnancy	105	38. Varicose Veins	84
11. Heart Disease	104	39. Auto Accidents	83
12. Smoking and Disease	104	40. Kidney Disease	83
13. Starvation and Malnutrition	104	41. Allergies	82
14. Suicide	103	42. Nausea	82
15. Abortion	102	43. Vietnam Combat	81
16. Alcohol Dependence	102	44. Halitosis or Body Odor	79
17. Drug Abuse	102	45. Homosexuality	78
18. Water Pollution	102	46. Airplane Accidents	77
19. Aging	98	47. Acne	76
20. Eye Disorders and Blindness	98	48. Accidents due to Electric Current	75
21. Poor Teeth and Decay	98	49. Asthma	75
22. Moodiness	97	50. Masturbation	73
23. Headaches	96	51. Poisoning by Snakes	72
24. Population Explosion	96	52. Riots	71
25. Emphysema and Respiratory Disease	95	53. Early History of Health	68
26. Mononucleosis	95	54. Firearm Accidents	64
27. Overweight	94		
28. Tuberculosis	94		

TABLE 3-4

Coefficient of Correlation* Between Male and Female Health Interests

Items		Relative Rank of Items by Males	Relative Rank of Items by Females
1.	Acne	49	47
2.	Emphysema or Respiratory Disease	39	25
3.	Venereal Disease	3	4
4.	Tuberculosis	37	27
5.	Mononucleosis	25	25
6.	Water Pollution	7	16
7.	Airplane Accidents	42	46
8.	Biological and Chemical Warfare	27	29
9.	Colds	29	31
10.	Starvation and Malnutrition	27	12
11.	Sterility	17	31
12.	Sex Behavior	10	7
13.	Drowning	37	37
14.	Use of Contraceptives	7	9
15.	Auto Accidents	31	39
16.	Population Explosion	17	23
17.	Vietnam Combat	40	43
18.	Smoking and Disease	1	12
19.	Varicose Veins	45	37
20.	Riots	42	52
21.	Nausea	51	41
22.	Moodiness	34	22
23.	Heart Disease	14	12
24.	Headaches	20	23
25.	Masturbation	32	50
26.	Pregnancy	14	9
27.	Poor Teeth and Decay	16	20
28.	Poisoning by Snakes	45	51
29.	Radiation	49	33
30.	Halitosis or Body Odor	52	44
31.	Overweight	25	27
32.	Mental Health	19	2
33.	Liver Diseases	34	29
34.	Nervousness	25	7
35.	Birth Control	5	4
36.	Childbirth	12	4
37.	Air Pollution	9	35
38.	Homosexuality	29	45
39.	Death	12	7

TABLE 3-4

(Continued)

Items	Relative Rank of Items by Males	Relative Rank of Items by Females
40. Atomic Warfare	45	37
41. Cancer	1	1
42. Suicide	22	14
43. Accidents Due to Electric Current	40	48
44. Firearm Accidents	53	54
45. Alcohol Dependence	10	16
46. Being Burned	49	34
47. Kidney Disease	36	39
48. Aging	20	20
49. Drug Abuse	6	16
50. Eye Disorders and Blindness	22	20
51. Allergies	34	41
52. Abortion	3	16
53. Early History of Health	54	53
54. Asthma	47	48

$$*\text{tau} = \frac{P-Q}{\sqrt{\left[n(n-1)/2 - K_x\right]\left[n(n-1)/2 - K_y\right]}}$$

tau = 0.6301

Kendall's tau coefficient of correlation

The same technique was used with the pretest health interests of the male subjects. Significant differences were not found between males and females on pretest and posttest interests (Tables 3-5 and 3-6, pages 42 and 43). A significant gain ($p < .047$) in scores for health interest was made by females in the interest curriulum (Table 3-7, page 44).

The interests between males and females in the high interest items were not found to be significantly different in pretest, posttest, or gain in health interests (Tables 3-9 through 3-11, pages 46 through 48).

3. Is there a significant difference between the achievement in health knowledge of male college students and female college students?

The investigator failed to find a significant difference between male and female pretest health knowledge, posttest health knowledge, or gain in health knowledge of males and females when comparing general health knowledge of males and females using an unbalanced two-way analysis of variance.

The analysis of the data appears in Tables 3-12, 3-13 and 3-14 on pages 49-51.

4. Is there a significant gain in achievement of students taught by use of a curriculum based on student health interests and felt needs?

Using a two-way analysis of variance with repeated measures on one factor, health knowledge, the investigator obtained an F value of $p < .0001$ when comparing pretest and posttest scores, indicating a highly significant gain in achievement. (See Table 3-15, page 52.)

TABLE 3-5

Two-Way Analysis of Variance Between Pretest Interest Scores of Males and Females and the Curricula in Which They Were Enrolled

	Male	Female
Interest Curriculum	M= 3.24 SD=0.47 N=16	M= 3.28 SD=0.72 N=14
Traditional Curriculum	M= 3.38 SD=0.45 N=12	M= 3.09 SD=0.55 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.62	0.21	0.67	0.575
Interest Curriculum vs. Traditional Curriculum	1.00	0.04			
Male vs. Female	1.00	0.23			
Within	56.00	17.36	0.31		
Total	59.00	17.98			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.62			
Interest Curriculum vs. Traditional Curriculum	1.00	0.02	0.02	0.05	0.825
Male vs. Female	1.00	0.21	0.21	0.68	0.413
Interaction	1.00	0.37	0.37	1.21	0.276*
Within	56.00	17.36			
Total	59.00	17.98			

*Significant differences were not found as a result of the computations in Table 3-5.

TABLE 3-6

Two-Way Analysis of Variance Between Posttest Interest Scores of Males and Females and the Curricula in Which They Were Enrolled

	Male	Female
Interest Curriculum	M= 3.10 SD=0.69 N=16	M= 3.50 SD=0.81 N=14
Traditional Curriculum	M= 3.59 SD=0.57 N=12	M= 3.39 SD=0.35 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.99	0.66	1.75	0.168
Interest Curriculum vs. Traditional Curriculum	1.00	0.50			
Male vs. Female	1.00	0.24			
Within	56.00	21.23	0.38		
Total	59.00	23.22			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.99			
Interest Curriculum vs. Traditional Curriculum	1.00	0.42	0.42	1.10	0.299
Male vs. Female	1.00	0.16	0.16	0.43	0.516
Interaction	1.00	1.33	1.33	3.50	0.067*
Within	56.00	21.23	0.38		
Total	59.00	23.22			

*Significant t-test value between males in the interest curriculum and males in the traditional curriculum; $t = 2.083$; df = 56; $p < 0.042$

TABLE 3-7

Two-Way Analysis of Variance Between Gains* in Health Interest Scores of Males and Females and the Curricula in Which They Were Enrolled

	Male	Female
Interest Curriculum	M= 0.14 SD=0.38 N=16	M= 0.22 SD=0.45 N=14
Traditional Curriculum	M= 0.21 SD=0.60 N=12	M= 0.29 SD=0.52 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.83	0.61	2.56	0.064
Interest Curriculum vs. Traditional Curriculum	1.00	0.80			
Male vs. Female	1.00	0.94			
Within	56.00	13.33	0.24		
Total	59.00	15.16			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.83			
Interest Curriculum vs. Traditional Curriculum	1.00	0.60	0.60	2.51	0.119
Male vs. Female	1.00	0.73	0.73	3.07	0.085
Interaction	1.00	0.30	0.30	1.24	0.270
Within	56.00	13.33	0.24		
Total	59.00	15.16			

*Gain = (Post-test) - (Pre-test)

TABLE 3-8

Significant t-tests for Two-Way Analysis of Variance Between Gains In Health Interest Scores of Males and Females and the Curricula In Which They Were Enrolled

$Item_1$	$Item_2$	t	df	p
Interest Curriculum	Male vs. Female	2.031	56	0.047
Interest Curriculum vs. Traditional Curriculum	Males	1.894	56	0.063

TABLE 3-9

Two-Way Analysis of Variance Between Pretest Interest Scores On the Interest Items Comprising the Interest Curriculum

	Male	Female
Interest Curriculum	M= 3.69 SD=0.56 N=16	M= 3.80 SD=0.68 N=14
Traditional Curriculum	M= 3.80 SD=0.50 N=12	M= 3.39 SD=0.70 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.79	0.60	1.54	0.215
Interest Curriculum vs. Traditional Curriculum	1.00	0.52			
Male vs. Female	1.00	0.41			
Within	56.00	21.81	0.39		
Total	59.00	23.60			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.79			
Interest Curriculum vs. Traditional Curriculum	1.00	0.41	0.41	1.06	0.307
Male vs. Female	1.00	0.30	0.30	0.77	0.385
Interaction	1.00	0.97	0.97	2.50	0.120*
Within	56.00	21.81	0.39		
Total	59.00	23.60			

*Significant differences were not found as a result of the computations in Table 3-9.

TABLE 3-10

Two-Way Analysis of Variance Between Posttest Interest Scores On The Interest Items Comprising the Interest Curriculum

	Male	Female
Interest Curriculum	M= 3.56 SD=0.71 N=16	M= 3.97 SD=0.74 N=14
Traditional Curriculum	M= 4.00 SD=0.65 N=12	M= 3.77 SD=0.47 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.84	0.61	1.50	0.226
Interest Curriculum vs. Traditional Curriculum	1.00	0.19			
Male vs. Female	1.00	0.17			
Within	56.00	22.96	0.41		
Total	59.00	24.80			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.84			
Interest Curriculum vs. Traditional Curriculum	1.00	0.15	0.15	0.35	0.554
Male vs. Female	1.00	0.13	0.13	0.32	0.573
Interaction	1.00	1.52	1.52	3.71	0.059*
Within	56.00	22.96	0.41		
Total	59.00	24.80			

*No significant difference between means of males in interest curriculum and males in traditional curriculum; t=1.81387; df=56; $p < 0.075$.

TABLE 3-11

Two-Way Analysis of Variance Between Gains* in Interest Scores
On the Interest Items Comprising the Interest Curriculum

	Male	Female
Interest Curriculum	M= 0.13 SD=0.42 N=16	M= 0.17 SD=0.34 N=14
Traditional Curriculum	M= 0.21 SD=0.76 N=12	M= 0.38 SD=0.60 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	2.22	0.74	2.50	0.069
Interest Curriculum vs. Traditional Curriculum	1.00	1.34			
Male vs. Female	1.00	1.11			
Within	56.00	16.59	0.30		
Total	59.00	18.81			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	2.22			
Interest Curriculum vs. Traditional Curriculum	1.00	1.05	1.05	3.56	0.064
Male vs. Female	1.00	0.82	0.82	2.77	0.102
Interaction	1.00	0.06	0.06	0.20	0.658**
Within	56.00	16.59	0.30		
Total	59.00	18.81			

*Gain = (Posttest) - (Pretest)
**Significant differences were not found as a result of the computations in Table 3-11.

TABLE 3-12

Two-Way Analysis of Variance Between Pretest Health Knowledge Scores Of Males and Females and the Curricula in Which They Were Enrolled

	Male	Female
Interest Curriculum	M= 41.06 SD= 5.57 N=16	M= 40.50 SD= 5.85 N= 14
Traditional Curriculum	M= 39.00 SD= 8.61 N= 12	M= 38.83 SD= 7.48 N= 18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	56.71	18.90	0.40	0.757
Interest Curriculum vs. Traditional Curriculum	1.00	54.15			
Male vs. Female	1.00	5.67			
Within	56.00	2676.94	47.80		
Total	59.00	2733.65			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	56.71			
Interest Curriculum vs. Traditional Curriculum	1.00	50.47	50.47	1.06	0.309
Male vs. Female	1.00	1.99	1.99	0.04	0.839
Interaction	1.00	0.57	0.57	0.01	0.913*
Within	56.00	2676.94	47.80		
Total	59.00	2733.65			

*Significant differences were not found as a result of the computations in Table 3-12.

TABLE 3-13

Two-Way Analysis of Variance Between Posttest Health Knowledge Scores of Males and Females and the Curricula in Which They Were Enrolled

	Male	Female
Interest Curriculum	M= 46.88 SD= 4.03 N= 16	M= 44.57 SD= 7.92 N= 14
Traditional Curriculum	M= 44.92 SD= 8.93 N= 12	M= 43.61 SD= 6.11 N= 18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	93.56	31.19	0.68	0.568
Interest Curriculum vs. Traditional Curriculum	1.00	41.67			
Male vs. Female	1.00	60.00			
Within	56.00	2570.37	45.90		
Total	59.00	2663.93			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	93.56			
Interest Curriculum vs. Traditional Curriculum	1.00	24.91	29.91	0.65	0.423
Male vs. Female	1.00	48.24	48.24	1.05	0.310
Interaction	1.00	3.65	3.65	0.08	0.779*
Within	56.00	2570.37	45.90		
Total	59.00	2663.93			

*Significant differences were not found as a result of the computations in Table 3-13.

TABLE 3-14

Two-Way Analysis of Variance Between Gains* in Health Knowledge Scores of Males and Females and the Curricula in Which They Were Enrolled

	Male	Female
Interest Curriculum	M= 5.81 SD=4.00 N=16	M= 4.07 SD=4.97 N=14
Traditional Curriculum	M= 5.92 SD=5.55 N=12	M= 4.78 SD=6.78 N=18

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	32.79	10.93	0.36	0.779
Interest Curriculum vs. Traditional Curriculum	1.00	0.82			
Male vs. Female	1.00	28.79			
Within	56.00	1677.39	29.95		
Total	59.00	1710.18			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	32.79			
Interest Curriculum vs. Traditional Curriculum	1.00	2.67	2.67	0.09	0.766
Male vs. Female	1.00	30.64	30.64	1.02	0.316
Interaction	1.00	1.33	1.33	0.04	0.834**
Within	56.00	1677.39	29.95		
Total	59.00	1710.18			

*Gain = (Posttest) - (Pretest)
**Significant differences were not found as a result of the computations in Table 3-14.

TABLE 3-15

Two-Way Analysis of Variance Between Pretest and Posttest Health Knowledge of Students and the Curricula in Which They Were Enrolled

	Pretest	Posttest
Interest Curriculum	40.800 n=30	45.800 n=30
Traditional Curriculum	38.90 n=30	44.133 n=30

Source	df	SS	MS	F	p
Between Subjects	59	4542.4916	76.9914		
Interest vs. Traditional	1	95.4087	95.4087	1.244	0.269
Subjects Within Groups	58	4447.0830	76.6738		
Within Subjects	60	1640.500	27.3417		
(Pre vs. Posttest)	1	785.4077	785.4077	53.299	0.0001
(Interaction)	1	0.4087	0.4087	0.028	0.868
Pre vs. Posttest x Subjects	58	854.6836	14.7358		
Within Groups Total	119	6182.9916			

t-test Values for Two-Way Analysis of Variance

$Item_1$	$Item_2$	t	df	p
Interest vs. Traditional	Pretest	0.84037	58	0.404
Interest vs. Traditional	Posttest	0.73717	58	0.464
Pre vs. Posttest	Interest Curriculum	7.13414	58	0.0001
Pre vs. Posttest	Traditional Curriculum	7.46707	58	0.0001

When students who had completed 11 or more semesters of high school and college science were compared with students who had completed 10 or fewer, significant differences were not found on pretesting, posttesting, or in gain in achievement. (Tables 3-16 through 3-18, pages 54-56).

Students with high grade-point averages, middle grade-point averages and low grade-point averages were compared to determine if significant differences existed among the scores on the pre- and posttests and on gain in achievement. See Table 2-3 for the classification of high, middle and low grade-point averages (GPA). Significant t-values between means ($p < .02$) were found for Low-GPA and High-GPA students on the pretest. (See Tables 3-19 and 3-20 on pages 57 and 58). On the posttest there were significant t values between the Low-GPA and High-GPA ($p < .023$) students and between the Middle-GPA and High-GPA ($p < .009$) students (See Tables 3-21 and 3-22 on pages 59-60). Significant differences in gain in achievement were not evidenced by the scores of students in the various GPA groups.

5. Is there a significant gain in achievement of students taught by use of a traditionally determined curriculum?

A highly significant ($p < .0001$) gain in achievement was evidenced by students in the traditional curriculum section of health on the basis of a two-way analysis of variance with repeated measures on one factor. (See Table 3-15 on page 52).

When students with a high number of semesters of science were compared with students with a low number of semesters of science, significant differences were not found on pretesting, posttesting or in gain

TABLE 3-16

Two-Way Analysis of Variance Between Pretest Health Knowledge Scores of Low Science and High Science Students and the Curricula in Which They were Enrolled

	Low Science	High Science
Interest Curriculum	M= 39.56 SD= 5.74 N= 16	M= 42.21 SD= 5.31 N= 14
Traditional Curriculum	M= 39.71 SD= 6.52 N= 17	M= 37.85 SD= 9.41 N= 13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	132.13	44.04	0.95	0.424
Interest Curriculum vs. Traditional Curriculum	1.00	54.15			
Low Science vs. High Science	1.00	3.35			
Within	56.00	2601.52	46.46		
Total	59.00	2733.65			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	132.13			
Interest Curriculum vs. Traditional Curriculum	1.00	53.31	53.31	1.15	0.289
Low Science vs. High Science	1.00	2.51	2.51	0.05	0.817
Interaction	1.00	75.48	75.48	1.62	0.208*
Within	56.00	2601.52	46.46		
Total	59.00	2733.65			

*Significant differences were not found as a result of the computations in Table 3-16.

TABLE 3-17

Two-Way Analysis of Variance Between Posttest Health Knowledge Scores of Low Science and High Science Students and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 45.13 SD= 5.75 N= 16	M= 46.57 SD= 6.72 N= 14
Traditional Curriculum	M= 43.65 SD= 6.84 N= 17	M= 44.77 SD= 7.99 N= 13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	66.57	22.19	0.48	0.699
Interest Curriculum vs. Traditional Curriculum	1.00	41.67			
Low Science vs. High Science	1.00	26.67			
Within	56.00	2597.37	46.38		
Total	59.00	2663.93			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	66.57			
Interest Curriculum vs. Traditional Curriculum	1.00	39.51	39.51	0.85	0.360
Low Science vs. High Science	1.00	24.51	24.51	0.53	0.470
Interaction	1.00	0.39	0.39	0.01	0.927*
Within	56.00	2597.37			
Total	59.00	2663.93			

*Significant differences were not found as a result of the computations in Table 3-17.

TABLE 3-18

Two-Way Analysis of Variance Between Gains* in Health Knowledge Scores Of Low Science and High Science Students and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 5.56 SD=4.15 N=16	M= 4.36 SD=4.92 N=14
Traditional Curriculum	M= 3.94 SD=5.53 N=17	M= 6.92 SD=6.90 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	77.17	25.72	0.88	0.456
Interest Curriculum vs. Traditional Curriculum	1.00	0.82			
Low Science vs. High Science	1.00	11.12			
Within	56.00	1633.02	29.16		
Total	59.00	1710.18			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	77.17			
Interest Curriculum vs. Traditional Curriculum	1.00	1.03	1.03	0.04	0.851
Low Science vs. High Science	1.00	11.33	11.33	0.39	0.536
Interaction	1.00	65.02	65.02	2.23	0.141**
Within	56.00	1633.02	29.16		
Total	59.00	1710.18			

*Gain = (Posttest) - (Pretest)

**Significant differences were not found as a result of the computations in Table 3-18.

TABLE 3-19

Two-Way Analysis of Variance Between Pretest Health Knowledge Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 38.20 SD= 4.98 N= 10	M= 40.00 SD= 5.53 N= 12	M= 45.25 SD= 4.13 N= 8
Traditional	M= 34.00 SD= 7.70 N= 7	M= 39.60 SD= 6.65 N= 10	M= 41.00 SD= 8.07 N= 13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	518.15	103.63	2.53	0.04
Interest Curriculum vs. Traditional Curriculum	1.00	54.15			
Low GPA vs. Middle GPA vs. High GPA	2.00	355.19			
Within	54.00	2215.50	41.03		
Total	59.00	2733.65			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	518.15			
Interest Curriculum vs. Traditional Curriculum	1.00	113.06	113.06	2.76	0.103
Low GPA vs. Middle GPa vs. High GPA	2.00	414.10	207.05	5.05	0.010
Interaction	2.00	49.90	24.95	0.61	0.548
Within	54.00	2215.50	41.03		
Total	59.00	2733.65			

TABLE 3-20

Significant t-tests for Two-Way Analysis of Variance Between Pretest Health Knowledge Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

$Item_1$	$Item_2$	df	t	p
Interest Curriculum	Low GPA vs. High GPA	54	2.32037	0.024
Traditional Curriculum	Low GPA vs. High GPA	54	2.33112	0.023

TABLE 3-21

Two-Way Analysis of Variance Between Posttest Health Knowledge Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 44.30 SD= 6.33 N= 10	M= 43.58 SD= 5.66 N= 12	M= 51.00 SD= 3.55 N= 8
Traditional Curriculum	M= 39.29 SD= 5.77 N= 7	M= 42.80 SD= 7.89 N= 10	M= 47.77 SD= 5.85 N= 13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	693.58	138.72	3.80	0.005
Interest Curriculum vs. Traditional Curriculum	1.00	41.67			
Low GPA vs. Middle GPA vs. High GPA	2.00	535.01			
Within	54.00	1970.35	36.49		
Total	59.00	2663.93			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	693.58			
Interest Curriculum vs. Traditional Curriculum	1.00	115.28	115.28	3.16	0.081
Low GPA vs. Middle GPA vs. High GPA	2.00	608.63	304.31	8.34	0.001
Interaction	2.00	43.29	21.64	0.59	0.556
Within	54.00	1970.35	36.49		
Total	59.00	2663.93			

TABLE 3-22

Significant t-tests for Two-Way Analysis of Variance Between Posttest Knowledge Scores of Students With Different Grade-Point Averages And the Curricula in Which They Were Enrolled

$Item_1$	$Item_2$	df	t	p
Interest Curriculum	Low GPA vs. High GPA	54	2.33834	0.023
Interest Curriculum	Middle GPA vs. High GPA	54	2.69001	0.009
Traditional Curriculum	Low GPA vs. High GPA	54	2.99575	0.004
Traditional Curriculum	Middle GPA vs. High GPA	54	1.95578	0.055

in achievement (Tables 3-16 through 3-18, pages 54-56).

Students in the traditional curriculum with High-GPA, Middle-GPA, and Low-GPAs, showed the same pattern as the students in the interest curriculum, namely, on the pretest there were significant differences ($p < .023$) between the scores of the Low-GPA and High-GPA students. On the posttest, significant differences ($p < .004$) were found between the scores of Low-GPA and High-GPA students and between those of the Middle-GPA and High-GPA ($p < .055$) students. (See Tables 3-21 and 3-22, pages 59 and 60.)

6. Is there a significant difference between the achievement of students being taught by a curriculum based on student health interests and felt needs and those taught by a traditionally determined curriculum?

Significant differences were not found in health knowledge of students in the two curricula, either on pretest or posttest scores or when students were grouped into High Science, Low Science, or into High-GPA, Middle-GPA, and Low-GPA. The data are found in Tables 3-15 through 3-23 on pages 52 through 62).

7. Is there a significant gain in health interests of students taught by use of a curriculum based on student health interests and felt needs?

A significant difference was not found in health interests when pretest and posttest scores were compared for the class whose curriculum was based on health interests (Table 3-24, page 63). Significant differences were not found in health interests when students with low science background were compared with students with high science backgrounds (Table 3-25, page 64). When students with different grade-point averages were compared, it was found on the pretest that the students with Low-GPAs had significantly differ-

TABLE 3-23

Two-Way Analysis of Variance Between Gains* in Health Knowledge Scores of Students with Different Grade-Point Averages and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 6.10 SD=3.67 N=10	M= 3.58 SD=5.79 N=12	M= 5.75 SD=2.76 N= 8
Traditional Curriculum	M= 5.29 SD=5.65 N= 7	M= 3.20 SD=4.47 N=10	M= 6.77 SD=7.54 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	113.56	22.71	0.77	0.577
Interest Curriculum vs. Traditional Curriculum	1.00	0.82			
Low GPA vs. Middle GPA vs. High GPA	2.00	104.85			
Within	54.00	1596.65	29.57		
Total	59.00	1710.18			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	113.53			
Interest Curriculum vs. Traditional Curriculum	1.00	0.01	0.01	0.00	0.985
Low GPA vs. Middle GPA vs. High GPA	2.00	104.05	52.02	1.76	0.182
Interaction	2.00	8.67	4.33	0.15	0.864**
Within	54.00	1596.65	29.57		
Total	59.00	1710.18			

*Gain = (posttest) - (Pretest)

**Significant differences were not found as a result of the computations in Table 3-23.

TABLE 3-24

Two-Way Analysis of Variance Between Pretest and Posttest Health Interest Scores of Students and the Curricula in Which They Were Enrolled

	Pretest	Posttest
Interested Oriented Curriculum	3.255 n=30	3.284 n=30
Traditional Curriculum	3.207 n=30	3.466 n=30

Source	df	SS	MS	F	p
Between Subjects	59	33.5561	0.5687		
Interest vs. Traditional	1	0.1347	0.1347	0.234	0.631
Subjects Within Groups	58	33.4215	0.5762		
Within Subjects	60	8.2648	0.1377		
Pre vs. Posttest	1	0.6192	0.6192	4.956	0.030
Interaction	1	0.3990	0.3990	3.194	0.079
Pre vs. Posttest x Subjects	58	7.2466	0.1249		
Within Groups Total	119	41.8209			

t-tests for Repeated Measures ANOVA

$Item_1$	$Item_2$	df	t	p
Interest vs. Traditional	Pretest	58	0.24660	0.806
Interest vs. Traditional	Posttest	58	0.93027	0.356
Pre vs. Posttest	Interest Curriculum	58	0.43904	0.662
Pre vs. Posttest	Traditional Curriculum	58	4.01336	0.0001

TABLE 3-25

Two-Way Analysis of Variance Between Pretest Health Interest Scores of Low Science and High Science Students and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 3.15 SD=0.48 N=16	M= 3.37 SD=0.69 N=14
Traditional Curriculum	M= 3.30 SD=0.44 N=17	M= 3.09 SD=0.61 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.70	0.23	0.76	0.522
Interest Curriculum vs. Traditional Curriculum	1.00	0.04			
Low Science vs. High Science	1.00	0.00			
Within	56.00	17.28	0.31		
Total	59.00	17.98			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.70			
Interest Curriculum vs. Traditional Curriculum	1.00	0.03	0.03	0.11	0.739
Low Science vs. High Science	1.00	0.00	0.00	0.00	0.961
Interaction	1.00	0.67	0.67	2.16	0.147*
Within	56.00	17.28			
Total	59.00	17.98			

*Significant differences were not found as a result of the computations in Table 3-25.

ent health interests than students with Middle-GPAs ($p < .018$) and students with High-GPAs ($p < .004$). (Tables 3-26 and 27, pages 66 and 67). The results of the posttest indicated that the students with Low-GPAs were significantly different ($p < .007$) in health interests from students with high GPAs and those with a Middle-GPA were significantly different ($p < .0182$) from students with High-GPAs (Tables 3-28 and 3-29, pages 68 and 69).

The investigator decided to examine only the nineteen items of the "Health Interest Questionnaire" that constituted the curriculum of the health class whose studies were based on health interests. A significant difference was not found between pretest and posttest scores on the high interest items (Table 3-30, page 70). When comparing students of Low Science backgrounds with those of High Science backgrounds, significant differences were not found on the high interest items (Tables 3-31 and 3-32, pages 71 and 72). When relationships were investigated between high interest items and different GPA groups, it was found that on the pretest the Low-GPA students had significantly ($p < .005$) lower interest on the items than did the High-GPA students (Tables 3-33 and 3-34, pages 73 and 74). On the posttest the Low-GPA students had significantly ($p < .039$) lower interest in these items than the High-GPA students. (Data are found in Tables 3-35 and 3-36, pages 75 and 76).

8. Is there a significant gain in health interests of students taught by use of a traditionally determined curriculum?

TABLE 3-26

Two-Way Analysis of Variance Between Pretest Health Interest Scores of Students with Different Grade-Point Averages and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 2.80 SD=0.41 N=10	M= 3.33 SD=0.47 N=12	M= 3.72 SD=0.58 N= 8
Traditional Curriculum	M= 3.09 SD=0.61 N= 7	M= 3.34 SD=0.60 N=10	M= 3.17 SD=0.41 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	4.16	0.83	3.25	0.013
Interest Curriculum vs. Traditional Curriculum	1.00	0.04			
Low GPA vs. Middle GPA vs. High GPA	2.00	2.33			
Within	54.00	13.82	0.26		
Total	59.00	17.98			

Weighted Means ANOVA

Source	df	SS	MS	F	p
Cells	5.00	4.16	0.83		
Interest Curriculum vs. Traditional Curriculum	1.00	0.10	0.10	0.38	0.542
Low GPA vs. Middle GPA vs. High GPA	2.00	2.41	1.21	4.72	0.013
Interaction	2.00	1.69	0.84	3.30	0.045
Within	54.00	13.82	0.26		
Total	59.00	17.98			

TABLE 3-27

Significant t-tests for Two-Way Analysis of Variance Between Pretest Health Interest Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

$Item_1$	$Item_2$	df	t	p
Interest Curriculum vs. Traditional Curriculum	High-GPA	54	2.41104	0.019
Interest Curriculum	Low-GPA vs. Middle-GPA	54	2.43918	0.018
Interest Curriculum	Low-GPA vs. High-GPA	54	3.81317	0.0004

TABLE 3-28

Two-Way Analysis of Variance Between Posttest Health Interest Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 2.88 SD=0.62 N=10	M= 3.23 SD=0.73 N=12	M= 3.87 SD=0.66 N= 8
Traditional Curriculum	M= 3.21 SD=0.64 N= 7	M= 3.54 SD=0.27 N=10	M= 3.55 SD=0.43 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	5.45	1.09	3.31	0.011
Interest Curriculum vs. Traditional Curriculum	1.00	0.50			
Low GPA vs. Middle GPA vs. High GPA	2.00	3.99			
Within	54.00	17.77	0.33		
Total	59.00	23.22			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	5.45			
Interest Curriculum vs. Traditional Curriculum	1.00	0.15	0.15	0.44	0.508
Low GPA vs. Middle GPA vs. High GPA	2.00	3.64	1.82	5.53	0.007
Interaction	2.00	1.31	0.65	1.99	0.147
Within	54.00	17.77	0.33		
Total	59.00	23.22			

TABLE 3-29

Significant t-tests for Two-Way Analysis of Variance Between Posttest Health Interest Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

$Item_1$	$Item_2$	df	t	p
Interest Curriculum	Low-GPA vs. High-GPA	54	3.60965	0.0007
Interest Curriculum	Middle-GPA vs. High-GPA	54	2.43623	0.0182

TABLE 3-30

Two-Way Analysis of Variance Between Pretest and Posttest Health Interest Scores of Students on the Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

	Pretest	Posttest
Interested Oriented Curriculum	3.742 n=30	3.752 n=30
Traditional Curriculum	3.555 n=30	3.864 n=30

Source	df	SS	MS	F	p
Between Subjects	59	39.0118	0.5612		
Interest vs. Traditional	1	0.041	0.0419	0.062	0.804
Subjects Within Groups	58	38.9700	0.6719		
Within Subjects	60	10.1533	0.1692		
Pre vs. Posttest	1	0.7648	0.7648	5.087	0.028
Interaction	1	0.6690	0.6690	4.450	0.039
Pre vs. Posttest x Subjects	58	8.7195	0.1503		
Within Groups Total	119	49.1651			

t-tests for Repeated Measures ANOVA

$Item_1$	$Item_2$	df	t	p
Interest vs. Traditional	Pretest	58	0.88198	0.381
Interest vs. Traditional	Posttest	58	0.52919	0.5980
Pre vs. Posttest	Interest Curriculum	58	0.14599	0.884
Pre vs. Posttest	Traditional Curriculum	58	4.36502	0.0001

TABLE 3-31

Two-Way Analysis of Variance Between Pretest Health Interest Scores of Low Science and High Science Students on the Health Interest Items That Comprise the Interest Curriculum and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 3.64 SD=0.52 N=16	M= 3.85 SD=0.71 N=14
Traditional Curriculum	M= 3.60 SD=0.63 N=17	M= 13.00 SD= 3.50 N= 13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.91	0.30	0.75	0.526
Interest Curriculum vs. Traditional Curriculum	1.00	0.52			
Low Science vs. High Science	1.00	0.06			
Within	56.00	22.69	0.41		
Total	59.00	23.60			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.91			
Interest Curriculum vs. Traditional Curriculum	1.00	0.51	0.51	1.26	0.266
Low Science vs. High Science	1.00	0.05	0.05	0.13	0.723
Interaction	1.00	0.34	0.34	0.84	0.364*
Within	56.00	22.69	0.41		
Total	59.00	23.60			

*Significant differences were not found as a result of the computations in Table 3-31.

TABLE 3-32

Two-Way Analysis of Variance Between Posttest Health Interest Scores of Low Science and High Science Students on the Health Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 3.63 SD=0.65 N=16	M= 3.89 SD=0.83 N=14
Traditional Curriculum	M= 3.91 SD=0.58 N=17	M= 3.81 SD=0.52 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.75	0.25	0.58	0.631
Interest Curriculum vs. Traditional Curriculum	1.00	0.19			
Low Science vs. High Science	1.00	0.09			
Within	56.00	24.05	0.43		
Total	59.00	24.80			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.75			
Interest Curriculum vs. Traditional Curriculum	1.00	0.20	0.20	0.46	0.501
Low Science vs. High Science	1.00	0.09	0.09	0.22	0.642
Interaction	1.00	0.46	0.46	1.08	0.303*
Within	56.00	24.05	0.43		
Total	59.00	24.80			

*Significant differences were not found as a result of the computations in Table 3-32.

TABLE 3-33

Two-Way Analysis of Variance Between Pretest Health Interest Scores of Students With Different Grade-Point Averages on the Health Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 3.33 SD=0.59 N=10	M= 3.80 SD=0.50 N=12	M= 4.17 SD=0.56 N= 8
Traditional Curriculum	M= 3.39 SD=0.96 N= 7	M= 3.65 SD=0.72 N=10	M= 3.56 SD=0.56 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	4.00	0.80	2.20	0.067
Interest Curriculum vs. Traditional Curriculum	1.00	0.52			
Low GPA vs. Middle GPA vs. High GPA	2.00	2.08			
Within	54.00	19.60	0.36		
Total	59.00	23.60			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	4.00			
Interest Curriculum vs. Traditional Curriculum	1.00	0.85	0.85	2.33	0.132
Low GPA vs. Middle GPA vs. High GPA	2.00	2.40	1.20	3.31	0.044
Interaction	2.00	1.07	0.54	1.48	0.238
Within	54.00	19.60	0.36		
Total	59.00	23.60			

TABLE 3-34

Significant t-tests for Two-Way Analysis of Variance Between Pretest Health Interest Scores of Students With Different Grade-Point Averages on the Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

$Item_1$	$Item_2$	df	t	p
Interest Curriculum	Low-GPA vs. High-GPA	54	2.91825	0.005
Interest Curriculum vs. Traditional Curriculum	High-GPA	54	2.22613	0.030

TABLE 3-35

Two-Way Analysis of Variance of Posttest Health Interest Scores of Students With Different Grade-Point Averages on the Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 3.44 SD=0.66 N=10	M= 3.67 SD=0.76 N=12	M= 4.26 SD=0.59 N= 8
Traditional Curriculum	M= 3.45 SD=0.77 N= 7	M= 4.00 SD=0.32 N=10	M= 3.98 SD=0.48 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	4.84	0.97	2.62	0.034
Interest Curriculum vs. Traditional Curriculum	1.00	0.19			
Low GPA vs. Middle GPA vs. High GPA	2.00	3.85			
Within	54.00	19.96	0.37		
Total	59.00	24.80			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	4.84			
Interest Curriculum vs. Traditional Curriculum	1.00	0.01	0.01	0.04	0.844
Low GPA vs. Middle GPA vs. High GPA	2.00	3.68	1.84	4.98	0.010
Interaction	2.00	0.98	0.49	1.32	0.276
Within	54.00	19.96	0.37		
Total	59.00	24.80			

TABLE 3-36

Significant t-tests for Two-Way Analysis of Variance Between Posttest Health Interest Scores of Students With Different Grade-point Averages on the Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

$Item_1$	$Item_2$	df	t	p
Interest Curriculum	Low-GPA vs. High-GPA	54	2.82897	0.006
Interest Curriculum	Middle-GPA vs. High-GPA	54	2.11284	0.039
Traditional Curriculum	Low-GPA vs. High-GPA	54	1.85701	0.069
Traditional Curriculum	Low-GPA vs. Middle-GPA	54	1.85259	0.069

In examining the pretest and posttest means of the section of Healthful Living that was taught by the traditional approach, one finds that this section gained significantly ($p < .0001$) in genereal health interest (Table 3-24). However, significant differences were not found between gains in health interests of the Low Science and High Science groups (Table 3-37, page 78). Also, significant differences were not found when gains in health interests were examined for different levels of GPA. (Table 3-38, page 79)

The health interests of the traditional group on the high interest items identified by, and used as, the curriculum of the other section was investigated. It was found that these students made significant ($p < .0001$) gains in interest in these high interest items (Table 3-30, page 70). When analogous scores of the students in the traditional section were examined between students with Low Science and High Science backgrounds significant differences were not found. When Low-GPA, Middle-GPA and High-GPA groups of students were investigated for their interests on the high interest health items significant differences were not found (Table 3-39, page 80).

9. Is there a significant difference between health interests of students taught through a curriculum based on student health interests and felt needs and those taught by a traditionally determined curriculum?

Significant differences were not found in health interests between the scores obtained by the two sections on the pretests and posttests (Table 3-24). When students with High Science and Low Science backgrounds were compared, significant differences in health interests

TABLE 3-37

Two-Way Analysis of Variance Between Gains* in Health Interest Scores of Low Science and High Science Students and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 0.03 SD=0.48 N=16	M= 0.03 SD=0.42 N=14
Traditional Curriculum	M= 0.21 SD=0.66 N=17	M= 0.33 SD=0.36 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.91	0.30	1.19	0.320
Interest Curriculum vs. Traditional Curriculum	1.00	0.80			
Low Science vs. High Science	1.00	0.04			
Within	57.00	14.25	0.25		
Total	59.00	15.16			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.91			
Interest Curriculum vs. Traditional Curriculum	1.00	0.81	0.81	3.20	0.079
Low Science vs. High Science	1.00	0.05	0.05	0.21	0.652
Interaction	1.00	0.06	0.06	0.23	0.634**
Within	56.00	14.25	0.25		
Total	59.00	15.16			

*Gain = (Posttest) - (Pretest)

**Significant differences were not found as a result of the computations in Table 3-37.

TABLE 3-38

Two-Way Analysis of Variance Between Gains* in Health Interest Scores of Students With Different Grade-Point Averages and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 0.08 SD=0.52 N=10	M= 0.10 SD=0.46 N=12	M= 0.15 SD=0.32 N= 8
Traditional Curriculum	M= 0.12 SD=0.59 N= 7	M= 0.20 SD=0.57 N=10	M= 0.38 SD=0.52 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	1.52	0.30	1.20	0.321
Interest Curriculum vs. Traditional Curriculum	1.00	0.80			
Low GPA vs. Middle GPA vs. High GPA	2.00	0.77			
Within	54.00	13.64	0.25		
Total	59.00	15.16			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	1.52			
Interest Curriculum vs. Traditional Curriculum	1.00	0.58	0.58	2.31	0.134
Low GPA vs. Middle GPA vs. High GPA	2.00	0.55	0.28	1.10	0.341
Interaction	2.00	0.16	0.08	0.32	0.725**
Within	54.00	13.64	0.25		
Total	59.00	15.16			

*Gains = (Posttest) - (Pretest)

**Significant differences were not found as a result of the computations in Table 3-38.

TABLE 3-39

Two-Way Analysis of Variance Between Gains* in Health Interest Scores of Students With Different Grade-Point Averages on the Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

	Low GPA	Middle GPA	High-GPA
Interest Curriculum	M= 0.11 SD=0.38 N=10	M= 0.13 SD=0.50 N=12	M= 0.09 SD=0.22 N= 8
Traditional Curriculum	M= 0.06 SD=0.85 N= 7	M= 0.34 SD=0.46 N=10	M= 0.42 SD=0.70 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	5.00	2.33	0.47	1.53	0.197
Interest Curriculum vs. Traditional Curriculum	1.00	1.34			
Low GPA vs. Middle GPA vs. High GPA	2.00	0.58			
Within	54.00	16.48	0.31		
Total	59.00	18.81			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	5.00	2.33			
Interest Curriculum vs. Traditional Curriculum	1.00	1.09	1.09	3.56	0.065**
Low GPA vs. Middle GPA vs. High GPA	2.00	0.33	0.16	0.53	0.589
Interaction	2.00	0.66	0.33	1.09	0.345
Within	54.00	16.48	0.31		
Total	59.00	18.81			

*Gain = (Posttest) - (Pretest)

**Significant difference between means of Middle-GPAs of interest curriculum vs. traditional curriculum; $t=1.99899$; df=54; $p<0.050$.

not detected (Table 3-40, page 82). However, there was a noticable gain ($p < .079$) but not significant gain, in interest by the High Science and Low Science students in the traditional sections as compared with the High Science and Low Science students in the interest curriculum (Table 3-37, page 78).

A comparison of the scores of students in the interest curriculum and the traditional curriculum on the high interest items that constituted the interest section's curriculum failed to show significant differences on either the pretest or posttest. (Table 3-30, page 70). Again, when the High Science and Low Science groups of each section were compared, significant differences were not detected (Table 3-41, page 83). When students in the various grade-point categories were compared, a significant difference ($p < .030$) was found between the High-GPA levels of the two sections with the traditional group having a lower mean interest on the pretest (Tables 3-33 and 3-34, pages 73 and 74). Significant differences were not found between the different GPA levels of either section on the posttest (Table 3-35, page 75). When gain in interests were compared for students in the different GPA groups, it was found that the Middle-GPA group of the traditional section had a significantly ($p < .050$) higher gain than the Middle-GPA group of the interest curriculum section (Table 3-39, page 80).

Another question to which an answer was sought was, "Is there a significant difference between evaluations of the teacher and of the section of Healthful Living by the students in each section."

TABLE 3-40

Two-Way Analysis of Variance Between Posttest Health Interest Scores of Low Science and High Science Students and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 3.18 SD=0.67 N=16	M= 3.40 SD=0.87 N=14
Traditional Curriculum	M= 3.50 SD=0.52 N=17	M= 3.42 SD=0.35 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.90	0.30	0.75	0.527
Interest Curriculum vs. Traditional Curriculum	1.00	0.50			
Low Science vs. High Science	1.00	0.05			
Within	56.00	22.32	0.40		
Total	59.00	23.22			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	0.90			
Interest Curriculum vs. Traditional Curriculum	1.00	0.51	0.51	1.28	0.263
Low Science vs. High Science	1.00	0.07	0.07	0.17	0.685
Interaction	1.00	0.33	0.33	0.83	0.365*
Within	56.00	22.32	0.40		
Total	59.00	23.22			

*Significant differences were not found as a result of the computations in Table 3-40.

TABLE 3-41

Two-Way Analysis of Variance Between Gains* in Health Interest Scores of Low Science and High Science Students on the Health Interest Items That Comprised the Interest Curriculum and the Curricula in Which They Were Enrolled

	Low Science	High Science
Interest Curriculum	M= 0.01 SD=0.43 N=16	M= 0.04 SD=0.38 N=14
Traditional Curriculum	M= 0.31 SD=0.75 N=17	M= 0.31 SD=0.56 N=13

Preliminary ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.36	0.45	1.45	0.237
Interest Curriculum vs. Traditional Curriculum	1.00	1.34			
Low Science vs. High Science	1.00	0.00			
Within	56.00	17.45	0.31		
Total	59.00	18.81			

Least Squares ANOVA

Source	df	SS	MS	F	p
Cells	3.00	1.36			
Interest Curriculum vs. Traditional Curriculum	1.00	1.35	1.35	4.32	0.042
Low Science vs. High Science	1.00	0.01	0.01	0.03	0.875
Interaction	1.00	0.01	0.01	0.03	0.862**
Within	56.00	17.45	0.31		
Total	59.00	18.81			

*Gain = (Posttest) - (Pretest)

**Significant differences were not found as a result of the computations in Table 3-41.

The "Student Evaluation of Biology Courses" was used as a measuring device to answer the aforementioned question. Values for scoring were from four (4) for "A" to zero (0) for "E". Each mean score for each item on the inventory is a letter grade equivalent for that particular item. It was decided to run a series of t-tests, one for each item. Some of the questions did not apply to the course Healthful Living. Questions such as numbers 7, 13 through 26, and 30, concerned the laboratory and these were eliminated from the analysis. As a result, 40 items were analyzed and their t-test values appear in Table 3-42, page 85.

When the instructor was evaluated by the students in both curricula, the ratings on the aforementioned device averaged 3.28 and 3.36 for the traditional and interest curricula respectively, out of a possible 4.00. These scores would be equivalent to between a "B" and "B+" grade for the instructor. Six items were significantly different to warrant individual consideration. Item 6, "Instructor is apparently interested in doing a good job" was rated significantly higher ($p < .05$) by the interest curriculum section. Also, the following items were ranked significantly higher by the interest curriculum:

12. The Instructor makes no pretension of "knowing everything" and will admit so when the occasion arises. ($p < .057$)

31. The films and other A-V material used were interesting and informative ($p < .05$)

34. Corrects tests and returns papers promptly. ($p < .05$)

40. Is willing to discuss tests and answers. ($p < .05$)

TABLE 3-42

t-tests for Student Evaluations of Healthful Living Course and the Instructor

	Traditional Curriculum		Interest Curriculum		
Item	Mean	SD	Mean	SD	t
1	3.724	0.45485	3.896	0.30993	1.686869
2	3.758	0.51096	3.896	0.40925	1.134617
3	3.586	0.56803	3.758	0.51096	1.215234
4	3.620	0.56148	3.655	0.61387	0.223208
5	3.000	0.65465	2.724	1.06558	1.187865
6	3.724	0.52756	4.000	0.00000	2.815884
8	3.241	0.57663	2.931	0.88362	1.583935
9	3.379	0.72770	3.551	0.57235	1.002869
10	3.413	0.62776	3.655	0.55264	1.554185
11	3.551	0.57235	3.724	0.45485	1.270001
12	3.517	0.50854	3.758	0.43549	1.941451**
27	3.379	0.94164	3.379	0.90292	0.000000
28	3.275	0.64898	3.379	0.72770	0.571336
29	3.344	0.55264	3.379	0.72770	0.203219
31	3.379	0.67685	3.724	0.59139	2.065985*
32	3.482	0.68768	3.724	0.59139	1.433141
33	2.689	0.84951	2.586	0.77998	0.483046
34	3.586	0.62776	3.862	0.35093	2.065591*
35	2.689	1.00368	2.896	1.04692	0.768221
36	3.068	0.84233	3.206	0.67502	0.688166
37	3.620	0.62185	3.206	0.67502	2.427908*
38	3.310	0.60376	3.103	0.77204	1.136797
39	3.310	0.76080	3.413	0.68228	0.545132
40	3.448	0.73611	3.827	0.46820	2.341410*
41	2.724	0.64898	2.862	0.83341	0.703193

TABLE 3-42 (Continued)

	Traditional Curriculum		Interest Curriculum		
Item	Mean	SD	Mean	SD	t
42	3.241	0.63556	3.344	0.61387	0.630457
43	3.241	0.83045	3.310	0.76080	0.329754
44	3.448	0.68588	3.517	0.68768	0.382379
45	2.965	0.77840	3.000	0.92582	0.153522
46	3.241	0.78627	3.482	0.78470	1.170155
47	3.241	0.78627	3.551	0.63167	1.657034
48	3.413	0.62776	3.379	0.77523	0.186154
49	3.482	0.63362	3.551	0.68588	0.397733
50	3.517	0.73779	3.620	0.56148	0.600859
51	3.103	0.93902	3.275	0.75102	0.772173
52	3.068	0.79870	3.103	0.77204	0.167164
53	2.758	0.78627	3.034	0.82300	1.305152
54	3.034	0.77840	3.275	0.64898	1.282608
55	2.965	0.73108	2.655	0.81397	1.527525
56	2.931	0.84223	2.551	0.82748	1.730009
TOTAL	3.287	0.29096	3.368	0.38550	1.072413

*Significant at $p < 0.050$ with 56 df
** Significant at $p < 0.057$

Only item 37, "coordinates length of exam with amount of time available" was rated significantly higher ($p < .05$) by the traditional section than by the interest curriculum.

CHAPTER IV

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

The Problem

The purpose of this study was to determine what relationships might exist between health knowledge and health interests of students who were taught in a traditional curriculum and of those who were taught in a curriculum based on health interests. Specifically, answers to the following questions were sought:

1. What are the health interests of college students?
2. Is there a significant difference between the health interests of male and female college students?
3. Is there a significant difference between the achievements in health knowledge of male college students and female college students.
4. Is there a significant gain in achievement of students taught by use of a curriculum based on student health interests and felt needs?
5. Is there a significant gain in achievement of students taught by use of a traditionally determined curriculum?
6. Is there a significant difference between the achievement of students being taught by a curriculum based on student health interests and felt needs and those taught by a traditionally determined curriculum?
7. Is there a significant gain in health interests of students taught by use of a curriculum based on student health interests and felt needs?
8. Is there a significant gain in health interests of students taught by use of a traditionally determined curriculum?
9. Is there a significant difference between health interests of students taught through a curriculum based on student health interests and felt needs and those taught by a traditionally determined curriculum?

Methods Employed

The subjects for the study consisted of students completing health education minors and others electing the Healthful Living course for the General Studies requirements at Western Michigan University. A total of 60 students ranging from freshmen to seniors were enrolled 32 males and 28 females.

The students were assessed with the following four instruments: Health Behavior Inventory (College Level), "Health Interest Questionnaire," "Background Questionnaire," and "Student Evaluation of Biology Courses." The major dependent variables consisted of measurements of health knowledge and health interests on the Health Behavior Inventory (College Level) and the "Health Interest Questionnaire." The independent variables were the traditional health curriculum and a health curriculum based on student health interests.

Analysis of Data

The primary statistical treatment used in this study was the two-way analysis of variance. Coefficients of correlation and *t*-tests were computed where deemed appropriate. Probability levels were reported for all major F-values used but only for the significant *t*-tests due to the vast amount of data. Significance was accepted at a probability level of .05. The results of the statistical analyses collected for this study are summarized below.

1. An analysis of ranked weighted scores of pretest health interests for the class based on health interests indicated that the ten topics of greatest interest were Cancer, Drug Abuse, Venereal Disease, Pregnancy, Heart Disease, Smoking and Disease, Abortion, Water Pollution, Mental Health and Birth Control.

2. A comparison of the two sets of ranked data of health interests for males and females using the Kendall tau coefficient of correlation yielded a value of .63. Both males and females were interested in the general areas of human sexuality, cancer and heart disease. Females were more interested than males in the areas of mental health, nervousness, death and suicide. Males were more interested than females in air pollution, water pollution and drug abuse.

3. The investigator failed to find a significant difference between the health knowledge of males and females either on the pretest or posttest or between gains in health knowledge.

4. A significant gain in achievement was found for students taught in a curriculum based on student health interests. Significant differences were not found on health achievement among the groups taught in the health interest curriculum when the independent variable was science background. When comparing scores on health achievement with different grade-point averages, it was found that on the pretest significant differences eixsted between the Low-GPA and High-GPA levels of the interest curriculum group. In the interest curriculum section on the posttest, significant differences were detected between the scores obtained by students in the Low-GPA and High-GPA groups and between those in Middle-GPA and High-GPA groups.

5. A significant gain in achievement from pretest to posttesting was found for students taught in the traditionally determined curriculum. The investigator failed to find significant differences in the traditional group when the factor of different levels of science background was considered. For various levels of GPA, student achievement in the traditional class was significantly different on the pretest for the Low-GPA and High-GPA students, whereas on the posttest, significant differences were found between Low-GPA and High-GPA students, in favor of High-GPA students and significant differences between Middle-GPA and High-GPA students in favor of High-GPA students.

6. Significant differences were not found in health knowledge between students in the two curricula, either on pretest or posttest scores or when students were grouped into High Science, Low Science, or into High-GPA, Middle-GPA and Low-GPA.

7. Significant gain was not found in general health interests of students taught in a curriculum based on student health interests. Significant differences were not found when examining gains in health interests of students with different levels of science background. Significant gains in health interest from pretesting to posttesting were detected for the Middle-GPA of the interest curriculum group.

8. An examination of the nineteen items of the "Health Interest Questionnaire" that comprised the curriculum of the health interest section failed to reveal significant differences in health interest scores on these items between pretest and posttesting. When relationships were investigated between Low Science and High Science students and gain in interest on the nineteen high interest items, significant gains were not found. In comparing different levels of GPA it was found that the High-GPA level was significantly higher than the other levels on both pretest and posttest.

9. A significant gain was found in general health interests of students taught by use of a traditionally determined curriculum. However, significant differences were not found between gains in health interests of the Low Science and High Science groups or for different levels of GPA.

10. Significant gains in interest were found for the traditional group on the high interest items identified by, and used as, the curriculum of the other section. However, significant differences were not found between gains in health interests of the Low Science and High Science groups or for different levels of GPA in the traditional section.

11. Significant differences were not found in health interests between the scores obtained by students in the traditional section and students in the health interest curriculum on either pretest or posttest.

12. A comparison of the means of students in the interest curriculum and the traditional curriculum on the high interest items that comprised the interest section's curriculum failed to show significant differences either pretest or posttest. Significant differences were not found on posttests between the two sections on either High Science and Low Science or on different levels of GPA. Gain in

interests for the Middle-GPA level was significantly higher for the traditional group than for the Middle-GPA level of the health interest curriculum section.

13. A significant difference was not found between the traditional and health interest curriculum sections on their evaluations of the instructor or for the course. Item analysis of the inventory yielded six different items that were significantly different between the two sections. Five of the items were ranked significantly higher by the interest curriculum, namely, "instructor interest," "does not pretend to 'know everything'," "A-V materials were interesting and informative," "corrects tests promptly," and "is willing to discuss test results.

Conclusions

Insofar as the results of the analysis of the data are valid, the following conclusions are justified.

1. Ranked weighted scores for the top eleven items of pretest health interests for the health interest curriculum were Cancer, Drug Abuse, Venereal Disease, Pregnancy, Heart Disease, Smoking and Disease, Abortion, Water Pollution, Mental Health, Birth Control and Air Pollution. The investigator suggests the following reasons for the ranking.

   (a) Cancer, Drug Abuse, Venereal Disease, Heart Disease, and Smoking and Disease are receiving a vast share of time and space in the public media as areas of great social concern.

   (b) Environmental concerns, as expressed by interest in Water Pollution and Air Pollution, have been stressed for several years in the public media. The public concern has now been transferred to the campuses in the form of courses offered to students.

2. Both males and females were interested in the general area of Human Sexuality, Cancer, and Heart Disease. Females were more interested than males in the areas of mental health, nervousness, death and suicide. Males were more interested than females in Air Pollution, Water Pollution and Drug Abuse. The following reasons are suggested for these findings.

(a) College age is a time when heterosexual expressions are at a maximal level. Therefore, human sexuality would be a natural area of interest. Heart Disease and Cancer, however, are two of the most publicized areas of health in the public media, since cancer strikes one in four people and is the second leading cause of mortality in the United States. Heart and blood vessel diseases kill and disable more Americans than any other group of illnesses.[65] Also, both of these afflictions are frequently found in several members of the same family.

(b) Females showing greater interest in mental health, nervousness, death and suicide are relating to emotional factors, for which females have long been credited, whether rightly or wrongly.

(c) Males' greater interest in Air Pollution and Water Pollution could be the result of child rearing practices in which males are associated with more outside activities. Drug Abuse is probably a male-dominated field of illicit behavior and would, therefore, be of greater interest to males.

3. Significant differences between male and female health knowledge were not detected either prior to or at the end of the presentation of course content. This finding is contrary to the findings of Kilander[66] and of Campbell and Early[67] who, on the basis of scores on a standardized health test, support the belief that females have better health knowledge than males.

4. A significant gain in achievement in health was found for students taught in a curriculum based on student health interests. Also, significant differences in achievement were detected between Low-GPA and High-GPA students and between Middle-GPA and High-GPA students on the posttest, the differences in favor of the High-GPA group. The following reasons are presented to account for these findings:

(a) As with students in the traditional curriculum (Point 5), the significant gain in achievement in health by students taught in the curriculum based on student health interests may result from the presentation of an organized body of knowledge in health. Despite the manner in which the content was selected, both courses were organized.

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[65]Marshall, Carter L. Dynamics of Health and Disease. N.Y.: Appleton-Century-Crofts, 1972, Pp. 132-143.

[66]Kilander, op. cit.

[67]Campbell and Early, op. cit.

(b) Academically superior students usually have higher GPAs, therefore, in an organized learning experience one may reasonably expect the superior student to do better.

5. A significant gain in achievement was found for students taught by use of the traditionally determined curriculum. On the posttest significant differences were found between Low-GPA and High-GPA students and between Middle-GPA and High-GPA students. The investigator again suggests the same reasons for the interest curriculum (Point 4a) also holds for the traditional curriculum.

6. Significant differences were not found in health knowledge between students in the two curricula either prior to or after the presentation of the course material. The investigator suggests that the importance of any structured learning experience far outweighs the factors on which the learning experience is structured.

7. A significant gain was not found from pretest to posttest in general health interests of students taught by use of a curriculum based on student health interests. It is possible that the males in the class lost interest in health while the females in the class gained in health interest. The reason for a loss of health interest by males is not known.

8. An examination of the nineteen items of the "Health Interest Questionnaire" that constituted the curriculum of the health interest section failed to reveal significant differences on those items between pretesting and posttesting for the interest curriculum section. The investigator attributes this phenomenon to the students' high interest level in these items initially as a saturation point in interest and that raising this level would be difficult.

9. Both males and females in the traditional curriculum section gained significantly in general health interests.

10. Significant gains in interest were found for the traditional group on the high interest items identified by, and used as, the curriculum of the other section. The investigator suggests that this may result from the general rise in health interest on these items that were part of a large group of items.

11. When comparing the mean scores on health interest of the two sections, significant differences were not found on either pretest or posttest. It would appear to the investigator that the "self-fulfilling prophecy" on the part of the instructor is not viable in this study since this was not what the "researcher expected to see."

12. When means of the students in the interest curriculum and the traditional curriculum were compared on the high interest items the researcher failed to find a significant different on either the pretest or posttest.

13. An evaluation of the instructor and the course in general failed to evidence a significant difference between the reactions of the traditional and health interest curriculum sections. An item analysis of the inventory used to evaluate the instructor indicated that students in the interest curriculum section rated the following items significantly higher than did those in the traditional course: "instructor interest," "does not pretend to 'know everything'," "A-V materials were interesting and informative," "corrects tests promptly," and "is willing to discuss test results." The investigator would like to note that Egan[68] in 1971, foundthat if teachers became more interested in a subject the students in that class became more interested. Yet this did not occur here. In fact, the opposite occurred. The investigator suggests that in view of the fact that he returned tests equally promptly in both health sections and was willing to discuss the tests while not trying to be a "know-it-all" in either section, that the "halo effect" was operating by permitting students to learn what they wanted and therefore affected their perceptions of the instructor.

Implications

Insofar as the above conclusions are valid, the following implications are apparent:

1. Although students frequently verbalize that they have certain topics in which they are interested in a course, it would seem that the inclusion of such topics would not appreciably affect the achievement of students in the course.

2. It seems that if students are taught on the basis of their interests, it will not appreciably affect their interest in the subject.

3. Major social problems such as drug abuse, venereal disease, smoking and environmental pollution are of major interest to the students and therefore programs in these areas are

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[68]Egan, Ann L. "An Evaluation of the Effect of Apparent Instructor Interest in Academic Subject Matter on Student Attitudes and Interests." Unpublished Doctor's Dissertation, University of New York, Buffalo, N.Y., 1971, p. lll.

attractive to college students. This makes the investigator question the feasibility of colleges doing away with health courses that are required for all students.

4. Sex differences in health interests do exist and should be kept in mind with regard to the nature and the intensity of health concerns taught in health classes.

Recommendations for Future Research

1. Since the sample of students was small and was taught by one instructor, it is suggested that the study be repeated on a much larger sample of students taught by several different instructors.

2. Attempts should be made to test more specifically the material covered in each student section by specific teacher-made tests rather than only comparing the student sections on a standardized test.

3. An attempt should be made to compare the retention of knowledge after the completion of the course based upon student interests with the retention of students taught by a traditonal course.

4. An investigation should be made to discover if those students who have high interest on a pretest in a student interest curriculum course are still the same students which show highest interest at the end of the course. Possibly after learning about an area, students may find that they are not really as interested as they thought they were.

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APPENDIX A

Health Behavior Inventory (College Level)

and Answer Sheet

Please Note:

Pages 103-104, "Health Behavior Inventory," copyright 1966 by McGraw-Hill, Inc., not microfilmed at request of author. Available for consultation at Western Michigan University Library.

University Microfilms.

APPENDIX B

Health Interest Questionnaire and Answer Sheet

111 Health Biology (2 credit hours)

In order to improve science courses taken by health minors and future health majors, this survey is being given to see what areas of health education you would be interested in being taught in a beginning health course.

The following list (Health Interest Questionnaire) was constructed from topics other college students have been concerned about. If you feel there are topics of interest to you which are not listed, please write them in the spaces provided at the end of the list of topics.

Do not mark on the questionnaire except to add items not on the list. Fill in only your name, section, social security number, and sex at the top of the answer sheet. The ranking of the topics (5-extremely interested to 1-not interested) should be marked on the answer sheet provided.

HEALTH INTEREST QUESTIONNAIRE

Name _____ Social Security No. _____ Sex: M__ F ___

Topic	Not Interested (1)	Mildly Interested (2)	Moderately Interested (3)	Very Interested (4)	Extremely Interested (5)
1. Acne					
2. Emphysema or Respiratory Disease					
3. Venereal Disease					
4. Tuberculosis					
5. Mononucleosis					
6. Water Pollution					
7. Airplane Accidents					
8. Biological & Chemical Warfare					
9. Colds					
10. Starvation & Malnutrition					
11. Sterility					
12. Sex Behavior					
13. Drowning					
14. Use of Contraceptives					
15. Auto accidents					
16. Population Explosion					
17. Vietnam Combat					
18. Smoking and Disease					
19. Varicose Veins					
20. Riots					
21. Nausea					
22. Moodiness					

Topic	Not Interested (1)	Mildly Interested (2)	Moderately Interested (3)	Very Interested (4)	Extremely Interested (5)
23. Heart Disease					
24. Headaches					
25. Masturbation					
26. Pregnancy					
27. Poor Teeth and Decay					
28. Poisoning by Snakes					
29. Radiation					
30. Halitosis or Body Odor					
31. Overweight					
32. Mental Health					
33. Liver Disease					
34. Nervousness					
35. Birth Control					
36. Childbirth					
37. Air Pollution					
38. Homosexuality					
39. Death					
40. Atomic Warfare					
41. Cancer					
42. Suicide					
43. Accidents Due to Electric Current					
44. Firearm Accidents					
45. Alcohol Dependence					
46. Being Burned					
47. Kidney Disease					
48. Aging					
49. Drug Abuse					
50. Eye Disorders and Blindness					
51. Allergies					

Topic	Not Interested (1)	Mildly Interested (2)	Moderately Interested (3)	Very Interested (4)	Extremely Interested (5)
52. Abortion					
53. Early History of Health					
54. Asthma					
55. _____					
56. _____					
57. _____					
58. _____					

WESTERN MICHIGAN UNIVERSITY - TESTING SERVICES

LAST NAME

FIRST NAME — MIDDLE INITIAL

BIRTH DATE (MO. / DAY / YR.)	SEX ☐ M F ☐	GRADE OR CLASS

COURSE	SECTION

INSTRUCTOR

NAME OF TEST

TEST FORM	TEST DATE	MO.	DAY	YR.

USE NUMBER TWO BLACK PENCIL ONLY

110

0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9
0	1	2	3	4		5	6	7	8	9

USE NUMBER TWO PENCIL ONLY

Answer choices for each item: T (1), F (2), 3, 4, 5

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100
101	102	103	104
105	106	107	108
109	110	111	112
113	114	115	116
117	118	119	120
121	122	123	124
125	126	127	128
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149	150		

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APPENDIX C

Background Questionnaire

HEALTHFUL LIVING (111) Code No.

Background Questionnaire (Confidential)

Name: _____
(Last) (First)

Social Security Number: _____

College Address: _____ Phone No.: _____

Sex: (1) Male (2) Female

Age: _____

College major(s): _____; _____

College minor(s): _____; _____

College level: (1) freshman ___
(2) sophomore ___
(3) junior ___
(4) senior ___

College grade point average (GPA): _____

High school science courses and/or health courses (circle one):

Subject	Year	
(1) Physics	1/2, 1, 1 1/2, 2	___
(2) Chemistry	1/2, 1, 1 1/2, 2	___
(3) Earth Science	1/2, 1, 1 1/2, 2	___
(4) Biology	1/2, 1, 1 1/2, 2	___
(5) Health	1/2, 1, 1 1/2, 2	___
(6) General Science	1/2, 1, 1 1/2, 2	___
(7) _____	_____	
(8) _____	_____	

(9) No high school sciences _____

(over)

College science courses and/or health courses (circle one - not including those presently enrolled in):

Subject	Year
(1) Physics	1/2, 1, 1 1/2, 2 ___
(2) Chemistry	1/2, 1, 1 1/2, 2 ___
(3) Earth Science	1/2, 1, 1 1/2, 2 ___
(4) Biology	1/2, 1, 1 1/2, 2 ___
(5) Health	1/2, 1, 1 1/2, 2 ___
(6) _____	_____
(7) _____	_____

(8) No college sciences _____

Number of credit hours presently enrolled in: _____

Number of hours presently employed: _____

APPENDIX D

Two Curricula Outlines

HEALTHFUL LIVING (BIOLOGY 111)

(Traditional)

James H. Price
Room 210 Wood Hall
Office Hours:
10-11:30
3-4:00 T Th

		Number of Class Periods	Chapters
I.	Introduction	1	Chapter 1
II.	Nervous System	2	Chapter 14
III.	Personality Development	2	Chapter 2
IV.	Mental Health		Chapter 3 and Chapter 2 (pp. 20-28)
	A. Psychosis	1	
	B. Neurosis	1	
	C. Suicide	1	
	D. Nervousness & Headaches	1	
V.	Exam I	1	
VI.	Preparation for marriage		Chapter 7, 9 & Scientific American Reprint
	A. Mate selection	2	
	B. Contraception	2	
VII.	Smoking	2	Chapter 5 & Scientific American Reprint
VIII.	Drugs		Chapter 4
	A. "Soft" drugs	1	
	B. "Hard" drugs	1	
IX.	Exam II	1	
X.	Alcohol	2	Chapter 6
XI.	Non-Communicable		
	A. Cardiovascular Diseases	2	Chapter 15
	B. Cancer	2	Chapter 16
	C. Diabetes Mellitus	1	
	D. Allergies, Asthma, and Arthritis	2	
XII.	Course Evaluation	1	
XIII.	Exam III	1	

HEALTHFUL LIVING (BIOLOGY 111)

(Interest)

James H. Price
Room 210 Wood Hall
Office Hours:
10-11:30
3-4:00 T Th

		Number of Class Periods	Chapters
I.	Introduction	1	Chapter 1
II.	Population Explosion	1	
III.	Pollution		
	A. Air	2	Chapter 21
	B. Water	2	
IV.	Family Planning		
	A. Birth Control	2	Chapter 7 (last half)
	B. Abortion	1	Chapter 9 (last half)
	C. Pregnancy	1	and Scientific Ameri-
	D. Child Birth	1	can Reprint
	E. Venereal Disease	2	Chapter 17 & Handout
	EXAM I		
V.	Mental Health		Chapter 3 and
	A. Psychosis	1	Chapter 2
	B. Neurosis	1	(pp. 20-28)
	C. Suicide	1	
	D. Nervousness and Headaches	1	
	EXAM II	1	
VI.	Mood Modifiers		
	A. "Soft" drugs	1	Chapter 4
	B. "Hard" drugs	1	Chapter 4
	C. Alcohol	2	Chapter 6
	D. Tobacco	1	Chapter 5 & Scientific American Reprint
VII.	Cancer	2	Chapter 16
VIII.	Cardiovascular Disease	2	Chapter 15
IX.	Course Evaluation	1	
X.	Exam III	1	

APPENDIX E

Student Evaluation of Biology Courses at Western Michigan University and Answer Sheet

Student Evaluation of Biology Course at Western Michigan University

The purpose of this evaluation is to improve course offerings in the Biology Department. We ask you to be as frank and constructive as possible. These evaluations will not be available to your instructor(s) until after final grades are registered. Do not place any identifying marks on this evaluation.

Any specific item on this evaluation that is not, in your opinion, applicable, should be omitted. Score each item on a four to zero basis where four (4) is an "A," two (2) is "C," etc.; you should view this as an opportunity to grade your instructor and the course.

Part I. LECTURE AND INSTRUCTOR

1. Instructor indicates a thorough understanding of subject matter.
2. Lecture material is up to date.
3. Instructor shows competence in related disciplines of science.
4. Lecture weaves together facts such that better understanding is achieved.
5. Course utilizes and ties in concepts from other disciplines such as chemistry, physics and mathematics.
6. Instructor is apparently interested in doing a good job.
7. Lecture enhances meaningful laboratory experiences.
8. Instructor's handwriting was legible.
9. Lectures are presented with clarity and in an orderly sequence.
10. Lectures represent more than a sketch of material presented in textbook.
11. Instructor is available for outside-of-class discussion and assistance.
12. The instructor makes no pretension of "knowing everything" and will admit so when the occasion arises.

Part II. LABORATORY AND LABORATORY INSTRUCTOR

13. The laboratory and lecture parts of this course were well coordinated.
14. In the laboratory I acquired skills which will help me in my future profession.
15. The laboratory was well equipped for the purpose of the course.
16. Adequate supplies were available.
17. The laboratory was well organized most of the time.
18. Laboratory reports were a useful experience.
19. The preparation of laboratory reports required reasonable time and effort.
20. Field trips were a worthwhile experience.
21. Individual and/or group projects were worthwhile.
22. The laboratory was stimulating.

23. The instructor was well prepared most of the time.
24. The instructor was willing to help when necessary.
25. Overall, the instructor did a good job.
26. In summary, I would say that the laboratory contributed significantly to my understanding and mastery of the subject matter.

Part III. COURSE MATERIALS

27. The instructor made thoughtful use of materials for the course beyond the textbook and laboratory manual.
28. The textbook is effectively illustrated.
29. Because of its organization and emphasis on important ideas, the textbook is a good selection.
30. The laboratory manual is good for its intended purpose.
31. The films and other A-V material used were interesting and informative.
32. The A-V materials were appropriate for the units of study with which they were used.
33. The reading of journal reports and library assignments was of considerable value to me in this course.

Part IV. TESTING AND GRADING

34. Corrects tests and returns papers promptly.
35. Responds to papers with some comments.
36. Uses tests which require understanding and not mere memorization of the material.
37. Coordinates length of exam with amount of time available.
38. Clearly states the question so as to minimize ambiguity.
39. Tests for knowledge of general concepts, ideas and principles.
40. Is willing to discuss tests and answers.
41. Uses a variety of methods for evaluating student achievement.
42. Takes necessary measures to prevent cheating.
43. Discusses method of testing and grading early in the semester.
44. You are aware of your standing in the course.
45. Avoids questions on trivia.
46. Testing and grading is fair and objective.

Part V. COURSE IN GENERAL

47. The course accurately reflected its catalog description.
48. Course stimulates independent thinking.
49. How does this course rate in terms of your overall general college education?
50. I would recommend this course to other students.
51. This course stimulates future study and/or work in biology.
52. Course shows how to apply biological principles.

53. The assignments and required activities were challenging and reasonable.
54. There was sufficient time to take notes.
55. How would you rate courses, in general, at Western Michigan University?
56. How would you rate instructors, in general, at Western Michigan University?

Part VI. ADDITIONAL COMMENTS