KNOWLEDGE RETENTION OVER THE SUMMER VACATION MONTHS AMONG VOCATIONAL EDUCATION STUDENTS IN OKLAHOMA

By

DANENE LYNNE HARTMAN

Bachelor of Science
Oklahoma State University
Stillwater, Oklahoma
1982

Master of Education
Central State University
Edmond, Oklahoma
1985

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Thesis Adviser

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Education in the United States received intense criticism during the 1980s. Starting with publication of A Nation at Risk, American schools were rebuked for their deteriorating quality and for declining student achievement. Proposals for reform included broad systemic changes such as increasing emphasis on the basic academics, elevating standards and expectations, and increasing the duration and intensity of academic learning time (National Commission on Excellence in Education, 1983).

Both academic and vocational education have been greatly affected by these allegations and have attempted to implement reforms designed to improve education across the nation. Many strategies have been suggested, but not all have received universal acceptance or agreement. One strategy that has been attempted by a limited number of school districts across the country is an extended school year. Gitlin (1988) suggested the following benefits of year-round schooling:

(a) Education is delivered in the way people learn--on a continual basis;

(b) Attendance rates are improved;

(c) Discipline problems are lessened;

(d) Fewer students and teachers experience burnout;

(e) Overcrowding is lessened;

(f) Enrichment opportunities are intensified; and,

(7) Knowledge loss over the summer months is reduced (Gitlin, 1988, pp. 16-19).

Statement of the Problem

The last benefit described by Gitlin (1988) has been the subject of much debate during the twentieth century. Substantiating the reduction of knowledge loss has been the purpose of numerous research studies that have shown conflicting and somewhat inconclusive results. There is, however, an absence in the literature of studies relating to the knowledge loss experienced by students enrolled in vocational education programs over the extended summer vacation. Area vocational-technical schools in Oklahoma, many of which currently operate year-round adult programs, might improve knowledge retention among secondary students if those programs were offered on a year-round basis. The problem then was the need to know the effect of the summer vacation upon knowledge retention among students enrolled in vocational education programs.

Purpose

The purpose of this research was to determine whether or not there is a significant change in knowledge retention over the summer vacation months among vocational education students.

Objectives of the Study

The objectives of the research were:

1. To determine if there is a significant change in knowledge retention over the summer vacation months among the total group of vocational education students.

2. To determine if there is a significant difference in knowledge retention among selected occupational groups of vocational education students.

Research Questions

Specific research questions for the study were:

1. Do vocational education students, as a group, experience a significant change in knowledge retention over the summer vacation months?

2. Do Business and Office Education students experience a significant change in knowledge retention over the summer vacation months?

3. Do Health Occupations Education students experience a significant change in knowledge retention over the summer vacation months?

4. Do Home Economics Education students experience a significant change in knowledge retention over the summer vacation months?

5. Do Marketing Education students experience a significant change in knowledge retention over the summer vacation months?

6. Do Trade and Industrial Education students experience a significant change in knowledge retention over the summer vacation months?

7. Is there a significant difference in knowledge retention over the summer months among occupational groups of vocational education students?

Hypotheses

The following null hypotheses were formulated for this study:

1. There is no significant difference between occupational competency pretest and posttest scores for the total group of vocational education students over the summer vacation months.

2. There is no significant difference in knowledge retention over the summer months among occupational groups of vocational education students, when differences among the groups have been adjusted with respect to initial knowledge of the subject matter (pretest) and the amount of occupationally-related summer activities.

Assumptions

The following assumptions were accepted to conduct the study:

1. The collected data were accurate.

2. The population is normally distributed.

3. The students involved in the study are representative of secondary vocational education students in Oklahoma.

4. The programs selected for the study are representative of the other programs in each respective occupational group.

5. The teachers acting as test administrators followed the prescribed procedure for test administration.

Limitations

Limitations to the current study include the following:

1. Constraints were imposed on the design of the study as a result of the need to test intact classrooms of junior-level students rather than a random sampling of students across all classes.

2. The students involved in the study were tested only in vocational programs where validated occupational tests were available through the Oklahoma Department of Vocational and Technical Education.

3. The posttest sample was smaller than the pretest sample due to student attrition.

4. Generalizability of the results may be affected by the reliability of the tests used.

5. The vocational students in the study represented only five of the seven occupational groups. (No Agriculture Education or Technology Education students were included in the study because those programs are not offered in area schools.) The findings and recommendations in the study may not apply directly to the other two occupational groups.

Scope of the Study

1. This study was limited to eleventh-grade secondary vocational education students in Oklahoma.

2. The student population was drawn from five of the 28 area vocational-technical schools.

Definition of Terms

Area School: For the purposes of the current study, area school is used as an abbreviated name for "area vocational-technical school."

Area Vocational-Technical School: A school established within commuting distance of neighboring high schools to provide occupational training for (1) high school juniors and seniors, (2) adult students, and (3) training for local industry (Public Information Office, 1985).

Business and Office Education: Vocational education programs that provide initial training, refresher training, and/or upgrade training of individuals, leading to employment and advancement in business and office careers (Public Information Office, 1985).

Continuation Rate: For the purposes of the current study, the percentage of students who continue in a vocational program from one school year to the next school year.

Health Occupations Education: Vocational education programs designed to prepare students for employment in the health occupation of their choice and to upgrade those already employed in a health field (Public Information Office, 1985).

Home Economics Education: Vocational education programs that have one of two aspects: Consumer and Homemaking Education or Occupational Home Economics. Consumer and Homemaking Education provides instructional programs, services, and activities that prepare youth and adults for the occupation of homemaking. Occupational Home Economics provides instruction in the areas of food and nutrition, consumer education, family living and parenthood education, child development and guidance, housing, home management, and personal clothing management (Public Information Office, 1985).

Marketing Education: Vocational education programs that meet the needs of persons who have entered or who are preparing to enter the expanding field of marketing, management, and/or any related occupation in the business operations and management areas (Public Information Office, 1985).

Occupational Group: For the purposes of the current study, occupational group is used as a general term for a related grouping of vocational education programs. An example of a specific occupational group is Business and Office Education.

Trade and Industrial Education: Vocational education programs that prepare high school students and adults for employment in service, manufacturing, or industrial occupations (Public Information Office, 1985).

Organization of the Study

Chapter I has introduced the study and has presented the problem, purpose, objectives, research questions, hypotheses, assumptions, limitations, and definitions used in the study. Chapter II provides a discussion of related literature concerning knowledge retention over the summer months. The procedural methodology used in the current study is presented in Chapter III. The findings are reported in Chapter IV. Chapter V offers a summary, conclusions, and recommendations related to the study.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The review of the literature has been divided into three major sections: a discussion of year-round schooling, a discussion of the relationship between time and learning, and a review of research findings related to losses of academic and vocational knowledge over the summer vacation months.

Year-Round Schooling

Extending the length of the school year has been proposed by a number of groups, such as the National Commission on Excellence in Education (1983). Justification for this proposal is due to the notion that there is a positive relationship between time and learning.

Goodlad (1984), in his book A Place Called School: Prospects for the Future, dealt with many educational reform issues. With regard to extending the school year, Goodlad stated:

> ...the time children and youths spend in school appears to affect rather directly the amount of their learning as measured by tests. Increasing annual attendance from 175 to 185 days appears to enhance achievement. This suggests that states should not reduce the length of the school year even for good purposes such as teachers' in-service education (p. 96).

Year-round schooling has been adopted by school districts across the United States for educational, financial, and/or social reasons.

Ballinger (1988a), a strong advocate of year-round schooling, contended that this new design for schools makes sense because it enhances student learning and because it places year-round schools in greater alignment with today's social and economic structure. He stated that over 400 schools across the United States have implemented year-round schooling for instructional reasons:

(a) Learning is more continual;

(b) Memory loss is reduced by shortening the summer vacation;

(c) Remediation can occur throughout the year by using more frequent vacation periods, rather than limiting it to summer school after nine months of failure and frustration; and,

(d) The instructional periods lend themselves to concepts of units, segments, or blocks of learning (p. 61).

A school district of 115 schools in Jefferson County, Colorado, committed to a plan of year-round schooling in 1974 (White, 1988). The year-round calendar was designed with three different vacation patterns and a division of the school year into six educational terms. Students continue to attend school 1080 hours, but they receive shorter, more frequent vacations during the school year. Although the plan was implemented initially to ease overcrowding burdens, White (1988) stated that one of the most noticeable educational benefits has been the opportunity for enrichment, remediation, and acceleration. Students are allowed, on a space-available basis, to attend classes during one of their vacation periods, if they so desire. White (1988) stated that the plan implemented in Colorado has had the added benefit of nearly eliminating the dropout problem at the high school.

The Martin Luther King Junior High School in New York City operationalized a year-round school which was designed to enhance and intensify educational opportunities for youth (Mastruzzi, 1987). The school

year consists of five "quinmesters" of either 45 or 46 days each. Enrollment in the year-round school is voluntary; however, more than 500 applications were received for the school's first year of operation. Mastruzzi (1987) stated that the planning group for the year-round school believed that the advantages included: increased retention of student learning; enhanced opportunities for remediation, enrichment, and acceleration; and increased instructional time to students.

Not everyone supports the concept of extending the school year. The subject remains quite controversial with opponents clearly voicing their objections or raising important questions.

Ellis (1984) claimed that arguments for lengthening the school year are "predicated on the notion that more time devoted to learning will yield proportionally higher achievement scores" (p. 1). Research, he contended, has found the relationship between time and achievement to be far less than expected. He did submit that there may be other reasons for extending the school year, such as the need to accommodate the requirements of the information age.

In 1983, the American Federation of Teachers took the position that they were willing to study proposals for lengthening the school year, but did not consider it a high priority. They contended that schools should make more effective use of the time they currently have at their disposal (Smith, 1983).

Time and Learning

The relationship between time and learning has been studied extensively by many researchers during the second half of the twentieth century.

Carroll (1963) proposed a model of learning as a function of time. Carroll's model was the starting point for most research relating to time and learning.

More recently, Karweit (1985) examined the issue of time and achievement by synthesizing nearly all of the previous related research. She stated that while Carroll's model depicted learning as a function of time needed and time spent, most of the more recent studies have only dealt with the amount of time spent. Karweit (1985) stated that more studies are needed that "disaggregate time into separable components" (p. 9).

Hossler, Stage, & Gallagher (1988) reported that there have been no research studies conducted that measure the impact of extending the school year within a controlled experimental design. They stated that:

> A conservative interpretation of the research available would suggest that extending the school year has a small but positive effect on student learning outcomes. Because the studies are relatively short-term, the possible cumulative effect of several years of small gains (which may produce significant increases in learning over the course of a student's educational experience) cannot be ignored (pp. 1-2).

Hossler, Stage, & Gallagher (1988) indicated that the primary question should deal with whether or not the gains in achievement would justify the additional costs.

Nearly all of the research dealing with time and learning have considered only the proposal of extending the actual length of time (in days or hours) that students spend in school. The researchers did not address the concern of shortening the length of time between learning episodes in order to enhance knowledge retention.

Research Findings

Academic Losses Over the Summer Vacation Months

The research relating to summer losses in academic areas has yielded differing results. For example, Bernard (1966) found significant losses in language and word study skills among 4.9-5.1 grade level students over the summer months. Other researchers found summer losses in arithmetic computational skills in a variety of grades (Bernard, 1966; Bruene, 1928; Patterson, 1925; Schrepel and Laslett, 1936; Scott, 1967; Seaward, 1950; and Wintre, 1986a).

Other studies, however, reported gains over the summer months. Reading gains were found in a variety of grade levels by Bruene (1928), Parsley and Powell (1962), Patterson (1925), Screpel and Laslett (1936), and Wintre (1986a). Parsley and Powell (1962) also found spelling gains for students from grades 2 to 7 and in mathematic's reasoning in grades 4 to 7.

One study was identified that related to academic losses over the summer vacation months among secondary students. That dissertation study, conducted by Robison (1985) through The Ohio State University, was similar in research design and methodology to the current study. The purpose of the study was to examine the effect of summer vacation on the amount of language loss incurred by secondary school students of first-year Spanish in listening, reading, writing, and vocabulary. The study also examined the nature and exposure to the Spanish language during the summer vacation and the relationship of such exposure to any subsequent language loss.

The subjects who participated in the study included 180 male and female students from five junior and senior high schools in southern New

England. A pretest/posttest design was used. Data analysis included alternate forms reliability, *t* test for correlated means, analysis of variance, repeated measures analysis of variance, and the Pearson product moment correlation (Robison, 1985).

The study included the following findings:

(1) Listening and reading comprehension were not affected by the summer vacation.

(2) Less advanced students experienced significant loss in writing, while the more advanced students did not.

(3) Vocabulary recognition and recall was significantly affected by the summer vacation.

(4) A sequence of forgetting was observed, and it varied according to the student's achievement level.

(5) Exposure to Spanish during the summer months correlated positively with subsequent performance in listening, writing, and vocabulary (Robison, 1985).

The time of year of testing also has resulted in differing findings. Following a research study to measure retention of academic skills over the summer, Wintre (1986b) wrote:

> Despite interactions between occasion and grade and occasion and content, the significant main effect for occasion indicates that, on average, students score higher on academic skills after the summer vacation (p.32).

Following an earlier study, however, Bernard (1966) stated:

> The summer vacation seems to have a variable effect on the skills measured by the achievement tests. With the common experience of attending school removed during the summer, with some children going to camp and others to summer school, with some children reading and others skiing, fall measurement maximizes the variable vacation effects. On this basis the very worst time to measure the products of teaching would seem to be the fall (p. 274).

Reasons for the differences in findings are difficult to determine, but could be related to a variety of factors. Wintre (1986a) stated that one possible explanation for academic losses in the area of mathematics computation is that it is the only content area that requires specific drills and practice for fluency. Wintre also suggested that the confusion in findings may be caused, in part, by studies that (1) lack rigor and reliability, and (2) because of possible interactional effects between variables.

Although the many research studies have produced differing and sometimes conflicting results, nearly all of the researchers agreed that further research should be conducted in other school districts to determine the generality of the results (Bernard, 1966) and to examine differential effects as a result of socioeconomic status, cultural membership, and education level of the family (Wintre, 1986a).

Vocational Losses Over the Summer Vacation Months

No research studies could be identified that had the specific purpose of determining whether or not there was significant change in knowledge retention over the summer months among vocational education students. There were, however, two studies identified that examined related purposes.

Hall, Ford, Whitten, and Pylant (1983) presented a study conducted by the Naval Training Analysis and Evaluation Group which found significant knowledge decay during the interval between graduation from a basic electricity/electronics (BE/E) school and entry into a construction electrician school. Regression analysis, analysis of variance, and *t* tests were used to evaluate pretest/posttest score variances obtained

from 307 basic electricity/electronics school graduates. From the results of those analyses, the following observations were made:

> (a) Higher ability students were found to have less decay of BE/E information than lower ability students with the same retention interval.
>
> (b) The number of days between the final BE/E test and the retest (i.e. retention interval) was the major factor influencing the amount of knowledge decay (p. 23).

Crowe and Veach (1986) described a research project conducted through the National Center for Research in Vocational Education at Ohio State University that studied the relationship between the learner, basic skills, and environmental characteristics. Students participating in the study represented four educational programs: college preparatory, general education, vocational noncooperative, and vocational cooperative. The final phase of the study focused on the retention of basic skills information three months after the end of the school term. Only junior-level students returning for their senior year were retested following the summer vacation period. Findings indicated that vocational noncooperative students did not retain significantly more or less math than general education students did. The college preparatory students, particularly whites and males, retained more math than did the general education students. White college preparatory students retained more reading skill than general education students did. The researchers stated that factors used in the study were generally not powerful in predicting learning retention. Crowe and Veach (1986) concluded:

> It was clear only that if students scored well at the end of the school year, they tended to score well at the beginning of the next year after the retention period (p.81).

Summary

Those who have advocated extending the length of the school year have done so for a variety of reasons. But the majority of those advocates agree that an extended school year promotes student learning and retention.

Many studies were reviewed that dealt with the relationship between time and learning. While there was a general lack of consensus among the results of those studies, they all tended to address the question of how extending the length of time in school affects learning, rather than how shortening the summer vacation affects retention.

A review of research findings relating to losses of knowledge retention over the summer vacation months yielded many differences in findings. The difference appeared to be caused by the purposes, methodologies, and subjects unique to each study.

There was an absence of studies done to examine the retention of knowledge over the summer months among vocational education students. Two related studies were identified. One study found that there was a strong relationship between knowledge decay and the number of days between the pretest and posttest. The second study found that the factors used were not significant in predicting learning retention. The researchers indicated that if students scored well on the pretest they also tended to score well on the posttest.

CHAPTER III

METHODOLOGY

The purpose of the study was to determine whether or not there is a significant change in knowledge retention over the summer vacation months among vocational education students. This chapter deals with methods used to accomplish the study's purpose. Specifically, the following sections are discussed: (a) type of research, (b) subjects, (c) instrument, (d) data collection procedures, and (e) analysis of data and statistical analysis.

Type of Research

To test the null hypotheses, the researcher used a pretest/posttest experimental design. Key (1974) defined experimental research as:

> an attempt by the researcher to maintain control over all factors that may affect the result of an experiment. In doing this, the researcher attempts to determine or predict what may occur (p. 134).

Because the treatment was "time" as experienced over the three summer vacation months, and because no secondary vocational education programs were being conducted during the summer months, an experimental control group was unavailable to enhance the research design. This may reflect a limitation to the generalizability of the results.

To control for intervening variables, such as summer work and other activities that might have enhanced the student's knowledge base, relevant data were collected at the time of posttest administration.

Sample

The study was conducted using a two-stage cluster sample (Gay, 1981) of eleventh-grade students who were in the first year of a two-year program in area vocational-technical schools in Oklahoma.

The first stage involved randomly selecting five area schools that met the following criteria: (1) Each area school had to offer one or more two-year vocational education program(s) for which validated occupational tests were currently available through the Oklahoma Department of Vocational and Technical Education; (2) Current year enrollments of junior students in the qualifying programs had to be sizable enough to justify testing; and (3) The area school must have demonstrated an average three-year continuation rate of 50 percent or greater in the qualifying programs.

The second stage of the cluster sample involved selecting two-year vocational classes for which validated tests had been developed within the identified area schools. The entire population of eleventh-grade students within the selected classes was included in the study.

Subjects

The individuals tested in the study were eleventh-grade students who were enrolled in vocational programs in five Oklahoma area vocational-technical schools. Of the five area schools, one was located in an urban area, one was suburban, and three were rural. The individuals tested were members of programs in the following occupational divisions: Business and Office Education, Health Occupations Education, Home Economics Education, Marketing Education, and Trade and Industrial

Education. The population for the study was all eleventh-grade students attending Oklahoma area vocational-technical schools.

Instrument

The instruments used for the pretest and posttest were the cognitive component of the "Occupational Testing Series" developed by the Occupational Testing Center of the Oklahoma Department of Vocational and Technical Education. The cognitive tests were a collection of criterion-referenced, performance-based questions related to actual tasks to be performed in a specific occupation. The test items were presented in the form of multiple choice questions that measure knowledge, comprehension, and application. Each test battery was reviewed and validated by a committee of industry and vocational education representatives (Occupational Testing Center, 1990).

A test-retest method was used to determine test reliability. The pretest and posttest scores were correlated using a Pearson product-moment correlation analysis to provide a measure of stability of each test. Gronlund (1981) stated that a large correlation coefficient indicates high stability and that "measures of stability in the .80's and .90's are commonly reported for standardized tests of aptitude and achievement over occasions within the same year" (p. 96). The reader is reminded that the tests administered for the study were criterion-referenced. According to Gronlund (1981):

> The traditional correlational estimates of reliability that have been used with norm-referenced tests are likely to provide misleading results when used with criterion-referenced mastery tests (p. 111).

He further stated that methods for determining the reliability of criterion-referenced tests are still in the developmental stages.

Because the study tested students from different programs within different occupational groups, more than one occupational test was used in the study (see Table I on the next page). Each test selected for a given program area was chosen to reflect a specific occupation for which eleventh-grade students had been prepared. The students may or may not have been adequately prepared to master the competency examination after their first year of training. But because the study was designed to examine the difference between spring 1990 and fall 1990 scores, the actual level of performance on the occupationally-specific test was not relevant to the study.

Data Collection Procedures

Preliminary Arrangements

Following the selection of area vocational-technical school districts and programs to be included in the sample, the researcher obtained agreement of participation from one or more school administrators (i.e., school superintendent and/or director of secondary programs) in each of the proposed sites. It was decided that the instructors of the participating vocational programs would serve as test administrators and that they would be allowed to determine the test administration date. The researcher felt that would not jeopardize test security because each district was geographically separated from the others and because no single type of occupational test was administered more than once in a given district.

TABLE I

OCCUPATIONAL COMPETENCY TESTS USED IN THE STUDY

Occupational Division	Occupational Tests Used*	Number of Test Items
Business and Office Education	Data Entry Clerk	54
	Word Processing I	36
Health Occupations Education	Nursing Assistant	71
Home Economics Education	Baker	50
	Teacher's Aide	57
Marketing Education	Master Employee Level	50
Trade and Industrial Education	Basic Operator (Cosmetologist)	50
	General Drafter	53
	Mechanical Drafter	73

* All tests were developed and validated by the Occupational Testing Center, Oklahoma Department of Vocational and Technical Education.

Pretest Administration

After administrative permission was granted, the instructor of each participating secondary vocational education program was provided pretests and computer answer sheets for the junior-level students as well as a test administration packet. The packet included a letter explaining the purpose of the study, a teacher information sheet, and instructions for test administration (see Appendix A). The materials were presented during the last week of April and the first week of May, 1990 to the instructors personally in three area school districts, to the secondary program director in the fourth area school district, and by mail in the fifth area school district. Each instructor was given the opportunity to ask questions regarding the testing procedure.

Instructors were requested to return the completed student answer sheets and the teacher information sheet immediately following test administration. The pretest answer sheets and teacher information sheets were received from all instructors by the first week of June, 1990. A total of 310 vocational students were administered the pretest.

Posttest Administration

The researcher worked very closely with school administrators to obtain the highest number possible of returning vocational students for taking the posttest. A list of pretested students from each respective school district was presented to the appropriate school administrator so that he/she could determine whether or not each student was enrolled in an area school program during the 1990-91 school year.

Testing materials were sent to test administrators by September 1, 1990 (see Appendix B). All posttests were administered during the month

of September. A total of 214 students completed usable posttests, representing 69.03 percent of the original pretested students.

Occupationally-Related Summer Activities Questionnaire

Each vocational student who took the posttest in September, 1990, was requested to complete a questionnaire designed to obtain the number of hours that the student had been involved in summer activities related to his or her area of occupational training (see Appendix C). Eight questions were included in the questionnaire. The questions were designed to cover all types of activities in which the students could have been involved, including: volunteer work, hobbies, reading activities, conferences, summer school, vocational short-term courses, and work experience.

Completed questionnaires were received from 100 percent of the posttested students. The students provided the average number of hours per week and the average number of weeks in the summer that they had participated in each of the eight activities (see Appendix D).

Analysis of Data and Statistical Analysis

Demographic data on each student tested was entered into a database using microcomputer software. The data collected included the student's name, social security number, grade level, program name, test name, and teacher name. Those items were collected specifically to facilitate student location during the fall semester. Only the researcher had access to the data to ensure confidentiality.

The answer sheets were computer-scored by the Occupational Testing Center of the Oklahoma Department of Vocational and Technical Education.

Test results were provided to the researcher via computerized data files. Student scores were then added to the database files. The computer files were manipulated so that all programs within the same occupational division were combined to facilitate statistical analysis.

One of the special problems with a pretest, posttest design is how to analyze difference, or change, scores. Kerlinger (1986) suggested using residualized or regressed gain scores, which are purged of the pretest influence. Residualized scores are:

> scores calculated from the pretest scores on the basis of the correlation between pretest and posttest, and then subtracting these predicted scores from the posttest scores to obtain the residual gain scores (p. 311).

To address that concern, research questions one through six were answered, and the first hypothesis was tested, by conducting correlated groups *t* tests. Popham and Sirotnik (1973) stated that the special *t* model was designed for the purpose of analyzing groups of scores when a positive correlation exists between those groups of scores. The presence of a positive correlation in mean differences must be considered when two measures have been taken for the same persons, as in pretest and posttest mean comparisons. In the current study, it was very likely that a positive correlation would exist. Popham and Sirotnik (1973) stated:

> The correlated *t* model embodies an adjustment expression which is subtracted from the denominator of the separate variance *t* model, thereby increasing the magnitude of *t*. The value of *t* is adjusted upward to compensate for the tendency of the means to be similar (p. 145.)

To determine the presence of a positive correlation between the pretest and posttest scores, a Pearson product-moment correlation coefficient analysis was conducted for each occupational group and the total group of vocational education students. In all cases where a positive

correlation was found that exceeded the critical value of *r*, a correlated groups *t* test was conducted.

Jaccard (1983) stated that the correlated groups *t* test was designed to analyze the relationship between the pretest and posttest when:

> (a) the dependent variable is quantitative in nature and is measured on approximately an interval level;
>
> (b) the independent variable is *within-subjects* in nature (it can be either qualitative or quantitative); and
>
> (c) the independent variable has two and only two values (p. 190).

The researcher selected the correlated groups *t* test because the independent variable was within-subjects in nature. The overall effect of the test was to control for disturbance variables, such as background and abilities of the participants. The within-subjects design allowed an estimate of the source of variability to be extracted from the data (Jaccard, 1983). An alpha of .05 was selected by the researcher.

When the correlated groups *t* test revealed significance, an eta squared for the correlated groups *t* test was conducted to determine the proportion of variability in the dependent variable that was associated with the independent variable after the variability caused by individual differences was removed (Jaccard, 1983).

To answer the seventh research question, and to test the second hypothesis, an analysis of covariance (ANCOVA) was conducted, using the pretest and the number of hours involved in occupationally-related activities as covariates.

Analysis of covariance was used to test the differences among means after controlling for initial mean differences among experimental groups on one or more covariates, control variables that are correlated with

the dependent variable (Kerlinger, 1986). An alpha level of .05 was selected by the researcher for the test.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

The purpose of the study was to determine whether or not there is a significant change in knowledge retention over the summer vacation months among vocational education students. The data for the study were obtained by administering pretests and posttests to a cluster sample of eleventh-grade students in five Oklahoma area vocational-technical schools. The cluster samples were representative of five occupational groups of related programs.

This chapter, which contains three sections, presents the findings of the research. The first section presents sampling results from the pretest and posttest administrations. The second section presents data relevant to the seven research questions. The third section presents data relevant to the two research objectives and the related hypotheses.

To answer research questions one through six, correlated groups *t* tests were used to analyze the pretest and posttest scores of the total group of vocational education students and each occupational group. Prior to the use of the test, the researcher established positive correlations between the pretest and posttest scores through calculation of Pearson product-moment correlation coefficients. The results of the tests are found in Table II on the next page. In each case the correlation coefficients exceeded the critical values of r at the .05 level of significance. Based on the findings, the correlated groups *t* test was deemed to be a more appropriate test than the independent groups *t* test.

TABLE II

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR PRETEST AND POSTTEST SCORES BY TOTAL GROUP AND OCCUPATIONAL GROUPS

Occupational Group	r	df	CV*
Business and Office Education	0.56**	39	0.308
Health Occupations Education	0.87**	47	0.282
Home Economics Education	0.88**	28	0.361
Marketing Education	0.48**	20	0.423
Trade and Industrial Education	0.72**	70	0.232
Total	0.74**	212	0.138

* Critical value of *r*
** Statistically significant

According to Bartz (1976), the correlated groups *t* test has a built-in correction for the amount of correlation between the pretest and post-test, thus making it less likely to make a Type II error.

A single classification analysis of covariance was used to answer research question seven. That statistical method was used to test the differences among means after controlling for the influence of the pretest and occupationally-related summer activities on the posttest. Prior to using the analysis of covariance, the researcher established a positive correlation between the posttest and the occupationally-related activity level through calculation of Pearson product-moment correlation coefficients. The results of those tests are found in Table III on the next page. For the Business and Office Education students and the total group of vocational educational students, the correlation coefficients exceeded the critical values of r at the .05 level of significance. Based on those findings, the occupationally-related summer activity level, in hours, was used as a covariate, along with the pre-test score. For all statistical analyses, an alpha of .05 was selected to test the hypotheses.

Sampling Results

Occupational competency pretests were administered to 310 eleventh-grade vocational education students in May, 1990. Of those, posttests were completed by 215 returning students in September, 1990. One post-test was deemed unusable, resulting in a final sample of 214 students completing both the pretest and the posttest. That reflects a retesting rate of 69.03 percent. Table IV, found on page 31, shows the distribution and percentage of students taking the pretest and posttest by occupational group. The next section of this chapter describes the

TABLE III

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENTS FOR POSTTEST SCORES AND OCCUPATIONALLY-RELATED ACTIVITY LEVEL BY TOTAL GROUP AND OCCUPATIONAL GROUPS

Occupational Group	r	df	CV*
Business and Office Education	0.39**	39	0.308
Health Occupations Education	0.14	47	0.282
Home Economics Education	0.27	28	0.361
Marketing Education	0.09	20	0.423
Trade and Industrial Education	0.15	70	0.232
Total	0.19**	212	0.138

* Critical value of *r*
** Statistically significant

TABLE IV

DISTRIBUTION AND PERCENT OF VOCATIONAL EDUCATION STUDENTS TAKING PRETEST AND POSTTEST BY OCCUPATIONAL GROUP

Occupational Group	Total Number Pretested	Percent of Total Pretested	Total Number Posttested	Percent of Total Posttested	Retest Rate by Occupational Group
Business and Office Education	61	19.68%	41	19.16%	67.12%
Health Occupations Education	66	21.19%	49	22.90%	74.24%
Home Economics Education	49	15.81%	30	14.02%	61.22%
Marketing Education	37	11.94%	22	10.28%	59.46%
Trade and Industrial Education	97	31.29%	72	33.64%	74.23%
Total	310	100.00%	214	100.00%	69.03%

results of statistical analyses performed on the pretest and posttest scores.

The findings related to the research questions were used to test the two research hypotheses, which are found in the third section of Chapter IV.

Findings Related to Research Questions

Research Question One

The entire sample of pretested and posttested students (n = 214) was analyzed to answer research question one, "Do vocational education students, as a group, experience a significant change in knowledge retention over the summer vacation months?" Table V, shown on the next page, presents the results of the analysis.

The pretest mean score (65.38) and the posttest mean score (65.47) reflected a 0.09 difference. The standard deviation for the posttest (15.23) was slightly lower than for the pretest (16.89).

A correlated groups *t* test was performed comparing the mean pretest and posttest scores of the total group of vocational education students included in the sample. The *t* value was not statistically significant ($t = 0.110$, $df = 213$, $p > .05$), indicating that the mean posttest score for the total group of vocational education students did not differ significantly from the mean posttest score at the .05 level.

Research Question Two

The sample of pretested and posttested Business and Office Education students (n = 41) was analyzed to answer research question two, "Do Business and Office Education students experience a significant change

TABLE V

RESULTS OF CORRELATED GROUPS *t* TEST FOR ENTIRE SAMPLE OF VOCATIONAL EDUCATION STUDENTS

Item	Mean	Standard Deviation	*t*
Pretest Score	65.38	16.89	0.110
Posttest Score	65.47	15.23	
Difference Score	0.09	11.61	

standard error of the mean for the differences = 0.795
df = 213, p .05 = 1.980

in knowledge retention over the summer vacation months?" Table VI, located on the next page, presents the results of the analysis.

The pretest mean score (51.33) and the posttest mean score (56.03) reflected a 4.70 difference. The standard deviation for the posttest (15.59) was slightly greater than for the pretest (14.44).

A correlated groups *t* test was performed comparing the mean pretest and posttest scores of the Business and Office Education students. The *t* value was statistically significant ($t = 2.11$, $df = 40$, $p < .05$), indicating that the mean posttest score for the Business and Office Education students was significantly greater than the mean pretest score. Eta squared for the *t* value was 0.100, which indicated a small relationship between the variables.

Research Question Three

The sample of pretested and posttested Health Occupations Education students ($n = 49$) was analyzed to answer research question three, "Do Health Occupations Education students experience a significant change in knowledge retention over the summer vacation months?" Table VII, shown on the next page, presents the results of the analysis.

The pretest mean score (71.92) and the posttest mean score (69.07) reflected a 2.85 difference. The standard deviation for the posttest (14.26) was slightly greater than for the pretest (13.91).

A correlated groups *t* test was performed comparing the mean pretest and posttest scores of Health Occupations Education students. The *t* value was statistically significant ($t = 2.80$, $df = 48$, $p < .05$). The mean posttest score for the Health Occupations Education students was significantly lower than the mean pretest score. Eta squared for

TABLE VI

RESULTS OF CORRELATED GROUPS *t* TEST FOR
BUSINESS AND OFFICE EDUCATION STUDENTS

Item	Mean	Standard Deviation	*t*
Pretest Score	51.33	14.44	2.106*
Posttest Score	56.03	15.59	
Difference Score	4.70	14.10	

standard error of the mean for the differences = 2.229
df = 40, p .05 = 2.021, * statistically significant

TABLE VII

RESULTS OF CORRELATED GROUPS *t* TEST FOR
HEALTH OCCUPATIONS EDUCATION STUDENTS

Item	Mean	Standard Deviation	*t*
Pretest Score	71.92	13.91	2.797*
Posttest Score	69.07	14.26	
Difference Score	2.85	7.05	

standard error of the mean for the differences = 1.018
df = 48, p .05 = 2.021, * statistically significant

the *t* value was 0.14, which indicated a small relationship between the variables.

Research Question Four

The sample of pretested and posttested Home Economics students (n = 30) was analyzed to answer research question four, "Do Home Economics Education students experience a significant change in knowledge retention over the summer vacation months?" On the next page, Table VIII presents the results of the analysis.

The pretest mean score (65.86) and the posttest mean score (64.88) reflected a 0.98 difference. The standard deviation for the posttest (17.62) was slightly greater than for the pretest (16.98).

A correlated groups *t* test was performed comparing the mean pretest and posttest scores of the Home Economics Education students included in the sample. The *t* value was not statistically significant ($t = 0.61$, $df = 29$, $p > .05$), indicating that the mean posttest score for the Home Economics Education students did not differ significantly from the mean pretest score at the .05 level.

Research Question Five

The sample of pretested and posttested Marketing Education students (n = 22) was analyzed to answer research question five, "Do Marketing Education students experience a significant change in knowledge retention over the summer vacation months?" Table IX, found on the next page, presents the results of the analysis.

The pretest mean score (64.84) and the posttest mean score (68.42) reflected a 3.58 difference. The standard deviation for the posttest (14.55) was lower than for the pretest (18.42).

TABLE VIII

RESULTS OF CORRELATED GROUPS *t* TEST FOR
HOME ECONOMICS EDUCATION STUDENTS

Item	Mean	Standard Deviation	*t*
Pretest Score	65.86	16.98	1.591
Posttest Score	64.88	17.62	
Difference Score	0.98	8.57	

standard error of the mean for the differences = 1.591
df = 29, p .05 = 2.045

TABLE IX

RESULTS OF CORRELATED GROUPS *t* TEST FOR
MARKETING EDUCATION STUDENTS

Item	Mean	Standard Deviation	*t*
Pretest Score	64.84	18.42	0.955
Posttest Score	68.42	14.55	
Difference Score	3.58	17.16	

standard error of the mean for the differences = 3.745
df = 21, p .05 = 2.080

A correlated groups *t* test was performed comparing the mean pretest and posttest scores of the Marketing Education students included in the sample. The *t* value was not statistically significant ($t = 0.95$, $df = 21$, $p > .05$), indicating that the mean posttest score for the Marketing Education students did not differ significantly from the mean posttest score at the .05 level.

Research Question Six

The sample of pretested and posttested Trade and Industrial Education students ($n = 72$) was analyzed to answer research question six, "Do Trade and Industrial Education students experience a significant change in knowledge retention over the summer vacation months?" Table X, found on the next page, presents the results of the analysis.

The pretest mean score (68.89) and the posttest mean score (67.73) reflected a 1.16 difference. The standard deviation for the posttest (12.28) was lower than for the pretest (14.83).

A correlated groups *t* test was performed comparing the mean pretest and posttest scores of the Trade and Industrial Education students included in the sample. The *t* value was not statistically significant ($t = 0.94$, $df = 71$, $p > .05$), indicating that the mean posttest score for the Trade and Industrial Education students did not differ significantly from the mean pretest score at the .05 level.

Research Question Seven

The entire sample of pretested and posttested students ($n = 214$) was analyzed by occupational group to answer research question seven, "Is there a significant difference in knowledge retention over the

TABLE X

RESULTS OF CORRELATED GROUPS *t* TEST FOR TRADE AND INDUSTRIAL EDUCATION STUDENTS

Item	Mean	Standard Deviation	*t*
Pretest Score	68.89	14.83	0.935
Posttest Score	67.73	12.28	
Difference Score	1.16	10.46	

standard error of the mean for the differences = 1.241
df = 71, p .05 = 2.000

summer months among occupational groups of vocational education students?" Table XI, located on the next page, presents the results of this analysis.

A single classification analysis of covariance was performed using the posttest scores as the dependent (criterion) variable, the occupational groups as the independent variable, and (1) the pretest scores and (2) the occupationally-related activity level (in hours) as the two content variables (covariates). The observed F ratio was not statistically significant ($F = 0.63$, $df = 4, 207$, $p > .05$). Relevant mean scores are provided in Table XII.

Findings Related to Research Objectives and Hypotheses

Research Objective and Hypothesis One

The first objective of the study was to determine if there is a significant change in knowledge retention over the summer vacation months among the total group of vocational education students.

The null hypothesis for objective one was, "There is no significant difference among occupational competency pretest and posttest scores for the total group of vocational education students over the summer vacation months."

According to the results found relating to research question one, the *t* value of 0.110 was not significant at the .05 level; therefore, the null hypothesis was not rejected. There was no significant change in knowledge retention among vocational education students over the summer vacation months.

TABLE XI

ANALYSIS OF COVARIANCE OF VOCATIONAL EDUCATION STUDENTS' PRETEST AND POSTTEST SCORES

	Residuals			
Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F
Between	4	268.06	67.01	0.634
Within	207	21,869.02	105.65	
Total	211	22,137.68		

p .05 = 2.41

TABLE XII

VOCATIONAL EDUCATIONAL STUDENTS CRITERION AND CONTROL VARIABLE MEANS BY OCCUPATIONAL GROUP

	Criterion	Control	
Occupational Group	Posttest Score	Pretest Score	Activity Level
Business and Office Education	56.03	51.33	77.57
Health Occupations Education	69.07	71.92	100.94
Home Economics Education	64.88	65.86	174.6
Marketing Education	68.42	64.84	205.45
Trade and Industrial Education	67.73	68.89	51.49
Total	65.47	65.38	100.89

Research Objective and Hypothesis Two

The second objective of the study was to determine if there is a significant difference in knowledge retention among occupational groups of vocational education students.

The null hypothesis for this objective was, "There is no significant difference in knowledge retention over the summer months among occupational groups of vocational education students, when differences among the groups have been adjusted with respect to initial knowledge of the subject matter (pretest) and the amount of occupationally-related summer activities."

According to the results found relating to research question seven, the F ratio of 0.63 was not significant at the .05 level; therefore, the null hypothesis was not rejected. There was no significant difference in knowledge retention over the summer months among occupational groups of vocational education students, after adjusting for initial differences among the groups and for summer activity levels.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine whether or not there is a significant change in knowledge retention over the summer vacation months among vocational education students. This chapter presents a summary of the findings, conclusions drawn from the findings, a discussion section, and recommendations.

There were two specific research objectives and two hypotheses for the study. The objectives of the research were:

1. To determine if there is a significant change in knowledge retention over the summer vacation months among the total group of vocational education students.

2. To determine if there is a significant difference in knowledge retention levels among occupational groups of vocational education students.

The subjects of the study were a cluster sample of eleventh-grade students attending five area vocational-technical schools in Oklahoma. The population for this study was eleventh-grade students attending Oklahoma area vocational-technical schools.

The data for the study were obtained by administering occupational competency pretests and posttests to the subjects. Three hundred ten pretests were administered in May, 1990. Posttests were given in September, 1990, following the summer vacation months. Two hundred

fourteen subjects completed usable pretests and posttests, representing a retesting rate of 69.03 percent.

The literature review included three major sections: a discussion of year-round schooling, a discussion of the relationship between time and learning, and a review of research findings related to losses of academic and vocational knowledge retention over the summer vacation months.

The analysis included conducting a correlated groups *t* test for the total group of vocational education students tested as well as for each of five occupational groupings. A single classification analysis of covariance (ANCOVA) was performed in order to determine if significant differences in knowledge retention existed among the occupational groups, after adjusting for initial differences and for summer activity levels.

Summary of Findings

An analysis of the data revealed that, as a total group, vocational education students maintained knowledge in their vocational subject areas over the summer vacation months. This result held true for three occupational groups: Home Economics Education, Marketing Education, and Trade and Industrial Education.

The two remaining occupational groups, Business and Office Education and Health Occupations Education, experienced changes in knowledge retention over the summer months. Results indicated that the Business and Office Education students experienced a significant increase in their occupational competency test scores, whereas the Health Occupations Education students experienced a significant decrease in their scores.

A single classification analysis of covariance, which tested for mean differences among the groups, while compensating for initial differences and summer activity level, yielded nonsignificant results.

Conclusions

Based upon the findings of the study, the following conclusions are drawn:

1. Extending, or restructuring the school year, for secondary vocational education students, based on the notion that the extended or restructured school year would reduce knowledge loss over the summer vacation period, is not a viable rationale at this point in time.

2. The nature of the subject matter, as reflected by the occupational groupings, does not impact significantly upon the amount of knowledge retention over the summer months among the total group of vocational education students. The variability within the occupational groups was greater than the variability among the groups.

Discussion

The results of the analysis, in general, suggest that vocational education students do indeed remember occupational knowledge over the summer vacation months. The three-month summer vacation period did not impact significantly upon how much they were able to remember.

Strong positive correlations between the pretest and posttest scores suggest high consistency in the way students score. Students who scored high during the spring testing tended to score high following the summer interlude. Conversely, students who scored low in the spring tended to score low again during the fall testing. This is consistent with the findings of Crowe and Veach (1986).

Individual analysis of the occupational groups yielded results worthy of further discussion. As reflected in the findings relating to research questions two through six, knowledge retention was maintained by students in three occupational groups: Home Economics Education, Marketing Education, and Trade and Industrial Education. Two occupational groups, Business and Office Education students and the Health Occupations Education students, experienced significant changes in their knowledge retention levels.

Business and Office Education students experienced a significant increase in their posttest mean score, whereas Health Occupations Education students experienced a significant decrease in their posttest mean score. It is interesting to note that the Business and Office Education students' mean scores on both the pretest and posttest were the lowest among the five occupational groups, whereas the Health Occupations Education students' mean scores were the highest. For both of those occupational groups, the significant changes in mean scores from pretest to posttest might be attributed, in part, to regression toward the total group mean.

The significant increase in the Business and Office Education students' mean score also could be related, in part, to their summer occupationally-related activities, as was evidenced by the small, but significant, correlation between their posttest scores and their summer occupationally-related activity levels. That provides implications for the vocational teacher, who could encourage and assist the students to pursue occupationally-related summer work activities.

Although not addressed by the current study, the nature of the content matter might have impacted upon the amount of knowledge retained by the Health Occupations Education students. The study conducted by

Robison (1985) found that Spanish vocabulary recognition and recall was significantly affected by the summer vacation period. Similarly, Health Occupations Education students deal with subject matter that is heavily dependent upon new terminology and unfamiliar concepts. Health Occupations students may have had little prior experience upon which to build a conceptual base for the new knowledge. A lack of summer repetition and reinforcement could be related to the loss experienced by the Health Occupations Education students.

A final observation relates to the results obtained from the analysis of the Marketing Education occupational group. Marketing Education students experienced a substantial increase in their posttest mean score. However, that increase was not found to be statistically significant, perhaps due to the small sample size ($n = 22$). If the sample size was increased by 20 subjects and the t value remained constant, the Marketing Education students' posttest mean score would reflect a significant increase.

Recommendations

The study has provided information concerning knowledge retention among vocational education students that was previously unavailable. The information that was presented should be useful to vocational educators and administrators in making decisions regarding an extended school year, summer work activities, and the review of subject matter for second-year students. The information also provides a number of implications for further research studies.

The following recommendations are offered:

1. Based on the findings of the study, it would appear that lengthy periods of review at the beginning of the fall semester may be

inappropriate. The vocational teacher should conduct an assessment of student knowledge levels at the beginning of the fall semester in order to determine the amount of review needed before introducing new subject matter.

2. The vocational teacher should encourage and assist students to pursue activities during the summer vacation, between the first and second year of the vocational program, that would reinforce and, perhaps, enhance knowledge levels.

The following recommendations are offered for further study:

1. A similar study should be conducted examining additional factors that could be related to knowledge retention, such as the students' ability or intelligence levels, socioeconomic factors, and the nature of the content matter.

2. Additional research should be conducted to determine if a relationship exists between knowledge retention and the frequency of use of occupational knowledge and skills over the summer vacation months.

3. A similar study with a larger Marketing Education sample size should be conducted to replicate the findings in the current study.

4. The current study does not support the need to reduce knowledge loss over the summer months as the sole criterion for extending or restructuring the school year. Additional studies should be conducted examining other factors, individually and interactively with knowledge retention, in order to support or refute the suggested benefits of year-round schooling found in the literature review.

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APPENDIXES

APPENDIX A

PACKET OF INFORMATION SENT TO TEACHERS PRIOR TO PRETEST ADMINISTRATION

April 25, 1990

Dear Vocational Education Instructor:

Thank you for assisting with a study of knowledge retention among vocational education students over the summer vacation period. Your participation as a test administrator in this study is very important in ensuring the validity and accuracy of the results.

To test for knowledge retention, I have planned for appropriate occupational tests to be given to junior level students at the end of the 1989-90 school year. Those same returning students will then be tested again at the beginning of the 1990-91 school year. I will be analyzing the difference between their spring and fall scores. The results are **NOT** being analyzed by program or school, but rather by total and by occupational division. Confidentiality will be maintained for each individual student taking the test. However, you may obtain class score averages and an item analysis following the study if you so desire.

The industry-validated tests used for this study have been supplied by the Evaluation and Testing Division of the Oklahoma Department of Vocational and Technical Education. You may contact the Testing staff for more information regarding the availability of duty/task lists and occupational tests by calling (405) 743-5410.

The tests have been designed for occupational completers. Your students may or may not be adequately prepared to master the examination after their first year of training. Please do not worry about this. Again, I am looking at difference scores, not how well each student performs on the occupationally-specific test.

You will find attached the instructions for administering the test and for submitting the test score sheets to the Oklahoma Department of VoTech. If you have any questions at all, please do not hesitate to call me toll free at 1-800-522-5810.

I will be glad to share the results of the study once it has been completed. Again, thank you for your cooperation.

Sincerely,

Danene Hartman
Coordinator of Planning

TEACHER INFORMATION SHEET

Please complete the following information sheet and return it with your students' answer sheets in the gold stamped, self-addressed envelop provided. This information will help me identify the school and program of each student for the fall test administration.

Teacher's Name: _____

School Name: _____

Program Name: _____

Test Name: _____

Occupational Test Number (on the front of each test): _____

Date of Test Administration: _____

Total number of tests administered: _____

Thank you for your assistance in administering the tests and for completing this form.

Danene Hartman
(405) 7435129

INSTRUCTIONS FOR TEST ADMINISTRATOR

General Instructions:

Prior to distributing the answer sheets, please ask the students **not** to fill in the student information requested on the left side of the answer sheet until full instructions have been given.

There are no time restrictions on the test other than those imposed by the normal length of your class period.

Answer sheets have been provided. A black lead (No. 2) pencil should be used to fill in the spaces.

After distributing the test booklets and the answer sheets, please read the following instructions to the students:

1. Use a black lead (No. 2) pencil only. (Do NOT use ink or ballpoint pen.)

2. Please begin by completing the student information part of the answer sheet:

   a. Spell out your last name, first name, and middle initial in the blank squares. Then fill in the circles containing the appropriate letters. Use blank circles to identify blank spaces.

   b. Complete your birth date by filling in the correct month, then completing the squares and circles for the day and year. Only the last two digits of your birth year should be entered.

   c. The identification number should be filled in with your social security number. Again, fill in the correct squares and circles.

   d. Complete the appropriate circle for your sex--female or male.

   e. In the space labeled "Grade or Education," fill in the blank with the handwritten number found on the first page of your test. **DO NOT** fill in this space with your grade level.

3. Now you are ready to take the occupational test. Read each question carefully and select the most appropriate answer from choices A through D.

4. Each item on the test corresponds to a number on the answer sheet. Fill in the answer sheet with your chosen response. Make heavy black marks that fill in the circle completely. Remember, there are no "E" selections on the tests.

5. As you proceed through the test, you should occasionally compare the item number on your test form with the item number on the answer sheet to make sure that you are marking the right location.

6. Erase cleanly any answer you wish to change.

7. Make no stray marks on the answer sheet as these are computer graded.

Following Test Administration:

After students have completed their tests, collect the answer sheets separately from the test booklets.

Place all student answer sheets along with your completed "Teacher Information Sheet" in the gold stamped self-addressed envelop provided. Seal and mail the envelop. Please keep the test booklets and I will pick them up at a later date.

APPENDIX B

LETTER SENT TO TEACHERS PRIOR TO POSTTEST ADMINISTRATION

September 1, 1990

Dear <Teacher's Name>:

This letter is to follow up on the pretest/posttest study that was initiated last spring. First, I would like to express my appreciation for your prompt action in administering and returning the pretests.

It is now time to administer the posttests for the study. You will find enclosed a packet of items needed to administer the posttest including (1) a list of students who took the spring pretest, (2) additional answer sheets, and (3) a questionnaire that each student taking the posttest should complete. The questionnaire is designed to let me know whether or not the students were involved in activities over the summer that might have enhanced their retention of the information.

I realize that some students may not have returned this fall. Please test the students that are available. It would also be helpful if you could work with your registrar or attendance clerk to determine if a "non-returning" student might have transferred to another vocational program. If so, perhaps we can obtain permission to get these students released from class long enough to take the posttest. Please let me know if you need any assistance with this activity.

As soon as the final results are completed, I will send you item analyses from both the pretest and the posttest. Please call me at 1-800-522-5810 if you have questions or concerns. Again, thank you very much for your help.

Sincerely,

Danene Hartman

APPENDIX C

SUMMER ACTIVITIES

QUESTIONNAIRE

YOUR SUMMER ACTIVITIES

The following questions are designed to identify activities in which you participated this past summer related to the vocational education program that you attended during the last school year.

For each question, please check "yes" or "no." If your answer to a question is "yes," then list 1) the average number of hours per week and 2) the average number of weeks that you spent involved in those activities

Remember, information should be provided only for work or activities that specifically related to your vocational training. Please answer the columns as completely and accurately as possible. You will not be evaluated on this information.

Name _____ Vo-Tech Program _____

Activity	Response		Average Hours per Week	Number of Weeks
1. Did you do volunteer work relating to your vocational training?	Yes ___	No ___		
2. Were you involved in a hobby relating to your vocational training?	Yes ___	No ___		
3. Did you do odd jobs relating to your vocational training?	Yes ___	No ___		
4. Did you read trade or profess--ional journals relating to your vocational training?	Yes ___	No ___		
5. Did you attend a conference, workshop, or seminar relating to your vocational training?	Yes ___	No ___		
6. Did you take a vo-tech evening or short-term training class relating to your vocational training?	Yes ___	No ___		
7. Did you take a summer school class related to your training?	Yes ___	No ___		
8. Did you work in a job related to your vocational training?	Yes ___	No ___		

If your answer to question #8 was "yes," please list your job title.

_____

Thank you with your cooperation and assistance with this questionnaire.

APPENDIX D

SUMMARY OF REPORTED OCCUPATIONALLY-RELATED SUMMER ACTIVITIES QUESTIONNAIRE

SUMMARY of REPORTED OCCUPATIONALLY-RELATED SUMMER ACTIVITY LEVELS
by OCCUPATIONAL GROUP and QUESTION

OCCUPATIONAL GROUP	TOTALS by QUESTION Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	TOTAL HOURS
Home Economics	103	90	222	100	94	20	148	4,461	5,238
Marketing Education	396	480	0	12	6	0	0	3,626	4,520
Business & Office	816	204	92	48	120	0	0	1,901	3,181
Health Occupations	282	505	538	178	192	75	0	3,176	4,946
Trade & Industrial Education	272	109	743	261	305	0	2	2,015	3,707
Totals:	1,869	1,388	1,595	599	717	95	150	15,179	21,592
Averages:	8.7	6.5	7.5	2.8	3.4	0.4	0.7	70.9	100.9
BY Percent of Column Totals									
Home Economics	5.5%	6.5%	13.9%	16.7%	13.1%	21.1%	98.7%	29.4%	24.3%
Marketing Education	21.2%	34.6%	0.0%	2.0%	0.8%	0.0%	0.0%	23.9%	20.9%
Business & Office	43.7%	14.7%	5.8%	8.0%	16.7%	0.0%	0.0%	12.5%	14.7%
Health Occupations	15.1%	36.4%	33.7%	29.7%	26.8%	78.9%	0.0%	20.9%	22.9%
Trade & Industrial Education	14.6%	7.9%	46.6%	43.6%	42.5%	0.0%	1.3%	13.3%	17.2%
	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

VITA

Danene Lynne Hartman

Candidate of the Degree of

Doctor of Education

Thesis: KNOWLEDGE RETENTION OVER THE SUMMER VACATION MONTHS AMONG VOCATIONAL EDUCATION STUDENTS IN OKLAHOMA

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Ardmore, Oklahoma, July 21, 1955, the daughter of J.O. and Donna Cook Brown.

Education: Graduated from Bob Jones Academy, Greenville, South Carolina, in 1972; received the Associate of Applied Science degree in Nursing from Tulsa Junior College, Tulsa, Oklahoma, in May, 1977; received the Bachelor of Science degree in Trade and Industrial Education from Oklahoma State University, Stillwater, Oklahoma, in May, 1982; received the Master of Education degree from Central State University, Edmond, Oklahoma, in May, 1985; and completed the requirements for the Doctor of Education degree at Oklahoma State University, Stillwater, Oklahoma, in December, 1990.

Professional Experience: Registered Nurse, Saint Francis Hospital, Tulsa, Oklahoma, 1977-1979; instructor of Surgical Technology, Tulsa County Area Vocational-Technical School, Tulsa, Oklahoma, 1979-1984; Program Director of Surgical Technology, Tulsa County Area Vocational-Technical School, 1984-1986; Coordinator of Planning, Oklahoma State Department of Vocational and Technical Education, Stillwater, Oklahoma, 1986 to present.

Professional Organizations: Oklahoma Vocational Association, American Vocational Association, Oklahoma Council of Local Administrators, Oklahoma Women in Educational Administration, Phi Delta Kappa, Kappa Delta Pi, and National Dropout Prevention Network.