To the Graduate Council:

I am submitting herewith a thesis written by Charles Lee Cates entitled "Construction of Achievement Tests for Selected Economic Concepts for Use in Independent Study." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts in College Teaching, with a major in Business Education.

George A. Wagoner

George A. Wagoner, Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:

Hilton A. Smith

Vice Chancellor
Graduate Studies and Research

CONSTRUCTION OF ACHIEVEMENT TESTS FOR SELECTED ECONOMIC CONCEPTS FOR USE IN INDEPENDENT STUDY

A Thesis

Presented for the

Master of Arts in College Teaching

Degree

The University of Tennessee, Knoxville

Charles Lee Cates

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1287932

DEDICATION

This study is dedicated to my wife, Terry. Without your aid, encouragement, and patience, this study would not have become a reality.

To a very special kind of person: Thanks, Honey.

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ABSTRACT

The problem of this study was to identify and explain selected introductory economic concepts to be learned in a course of independent study in post secondary, introductory economics and to compare performance of students who have completed independent study against performance of students who have completed large group, televised lectures on an achievement test. The purpose was to develop and evaluate an alternative to the large-group, televised-lecture format of instruction which was the method of instruction being used for introductory economics at The University of Tennessee, Knoxville.

This study consisted of three segments, each covering one quarter of an academic year. In the first segment concepts were identified and explained. These selected concepts were then grouped into logical order and arranged in relation to a central topic.

In the next segment achievement tests were constructed for measuring learning of the concepts. These tests were administered on a pilot administration basis for analytical purposes. A 40-item, multiple response instrument was developed and standardized for use in making comparisons of performance subsequent to the experiment.

In the final segment volunteers were selected for participation in the experiment. These volunteers were subdivided into two groups, one which would read both the normally assigned materials and the concept explanations and one which would read only the concept explanations. The participants were paced through the first one-third of the course by implementation of deadlines for completion of certain achievement tests.

Upon termination of the experiment, all students took the instrument that was developed in the second segment and comparisons were made.

Based on the analysis of test scores received on the 40-item instrument, it was found that independent study students using both the regularly assigned reading material and the concept explanations scored significantly higher than the class attenders and the experimental students who read only the concept explanations. It was also found that the class-attending students scored significantly higher than the experimental students who read only the concept explanations.

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CHAPTER I

INTRODUCTION

Little doubt exists concerning the increasing preoccupation of modern education with the formal study of economics, both from a pragmatic and a philosophical point of view. At least one publication, The Journal of Economic Education, published by the Joint Council on Economic Education, is devoted exclusively to educational economics. Colleges and universities across the nation report increases in enrollment for basic courses in economics. In Tennessee, the instruction of economics at the secondary level of education has been mandated by the legislature.

Escalating awareness of the importance of economic questions is highly desirable for it is truly an economically chaotic and uncertain world today, filled with "economic quckery,"[1] grossly misleading information and distorted and aberrated facts concerning economic reality and the operation of the American economy. As a fundamental requirement to becoming an informed member of the electorate, students at the higher education level should be sufficiently trained in economic matters as to be able to think critically about economic phenomena and decipher false and misleading feedback. Frederick R. Kappel, past Chairman of the Executive Committee for American Telephone and Telegraph stated the importance of economic education in these terms:

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[1]Campbell R. McConnell, Economics: Principles, Problems and Policies (New York: McGraw-Hill, 1972), p. 17.

> If we have enough voters totally ignorant of economic pros and cons, they can vote the country down the drain without even knowing it.[2]

The goal of increased economic literacy of the general populace through more effective economic education is not, however, one within easy reach. Economic education, especially at the elementary level, has not been an area of education characterized by innovative and novel teaching/learning techniques. The reasons for this apparent perpetuation of the status quo are not particularly important. The basic resistance to change in economic education, however, probably lies in the words of Keynes:

> The difficulty lies, not in new ideas, but in escaping from the old ones, which ramify, for those brought up as most of us have been, into every corner of our minds.[3]

A. BACKGROUND FOR THE STUDY

Economic education at the elementary level at The University of Tennessee, Knoxville, is comprised of three quarters of principles work. The first course, Economics 2110, is a principles course which introduces the student to economics and the methodology of the economist. The course is presented in the form of a televised lecture, three times a week. The instructor broadcasts live to four morning sections of from 60 to 200 students per section. A videotape is then rebroadcasted to

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[2] Joint Council on Economic Education, "Joint Council on Economic Education: What It Is, What It Does, Why It Does It" (pamphlet for distribution to the general public, undated).

[3] John M. Keynes, The General Theory of Employment, Interest and Money (New York: Harcourt, Brace and World, 1953), p. viii.

three or four afternoon sections of approximately 60 to 200 students per section at two different hours. Students may also view the televised lecture at other locations throughout the campus, such as in certain residence halls.

Each section is staffed with two proctors, usually one graduate student and one upperclass undergraduate. The functions of these proctors are to answer questions and to resolve the minor problems of administration of the course. Once a week a tutorial session is held by a graduate student. In addition, the instructor conducts a tutorial session prior to each examination. If a student is absent from any given lecture, that day's lecture may be viewed in the undergraduate library on a video cassette.

Tests are given three times a quarter. Each test contains 40 multiple-response items. The scores on these tests are converted into letter grades based on relative performance. The letter grades are then translated into a weighted score, the accumulation of which determines the final letter grade for the course. The scale of requisite weight points for each letter grade of A, B, C, D, and F is predetermined and given to the student at the beginning of the course.

B. STATEMENT OF THE PROBLEM

The problem of the study is to identify and explain selected introductory economic concepts to be learned in a course of independent study in post secondary, introductory economics and to compare performance of students who have completed independent study against performance of students who have completed large-group, televised lectures. The

hypotheses to be tested are:

A. Independent-study students who read only concept explanations will not score significantly different from independent-study students who read both concept explanations and textbook materials.

B. Independent-study students who read only concept explanations will not score significantly different from students in the large-group, televised-lecture.

C. Independent-study students who read both concept explanations and textbook materials will not score significantly different from students in the large-group, televised-lecture.

C. JUSTIFICATION FOR STUDY

The large-group, televised-lecture method of instruction does not provide for all students' educational needs. For example, the large-group, televised-lecture method forces all students to proceed through a course at very nearly the same pace and offers only one opportunity to demonstrate achievement in learning of any given assignment. The learning process of the more capable student, including the student who enrolls with prior knowledges and understandings in economics, may be impeded due to having to proceed at a relatively slow pace. The large-group, televised-lecture method places unwarranted pressure on the student who learns more slowly to keep pace with the "average" student.

An alternative to the large-group, televised-lecture method is a course of independent study. In a course of independent study, the student is informed of what is to be learned and is permitted a pace determined best by the student but is not permitted to excessively

procrastinate. The student is also permitted more than a single opportunity to demonstrate performance on achievement tests for given assignments and is permitted to take a test whenever ready. Courses of independent study have been developed for other courses and implemented successfully, which clearly demonstrates the feasibility of the independent course of study.

Identification and explanation of concepts to be learned and construction of achievement tests could constitute the substance of a course of independent study. If concepts to be learned can be identified and explained in a format which can be understood by the student and if valid and reliable achievement tests can be constructed with which to measure student achievement, then the alternative to the large-group, televised-lecture method can come closer to a reality.

D. DEFINITION OF TERMS

For the purpose of this study, the following terms are defined:

1. Independent study. A course of study wherein the student does not attend formal classes, but rather gains knowledges and understandings independently of a class, by utilization of a written explanation of selected introductory economic concepts.

2. Large-group, televised-lecture. A method of instruction whereby the instructor broadcasts via television to classes of from 60 to 200 students.

3. Introductory economic concept. Those elementary economic concepts which are introduced in the course, Economics 2110, at The University of Tennessee, Knoxville.

4. Control group. Those students enrolled in Economics 2110, Spring Quarter, 1976, who attended a large-group, televised-lecture three times a week.

5. Concept explanation. A written explanation of a particular economic concept, in concise, clear language.

6. Experimental text-readers. Those students participating in independent study Spring Quarter, 1976, and reading both the regularly assigned textbook materials and the concept explanations. These students were selected from the morning classes.

7. Experimental nontext-readers. Those students participating in independent study Spring Quarter, 1976, and reading only the concept explanations. These students were selected from the afternoon classes.

E. LIMITATIONS

The development of the course of independent study is limited to the first one-third of the first course of introductory economics at The University of Tennessee, Knoxville.

F. OVERVIEW OF PROCEDURES

The study was begun by identifying the elementary concepts in the course, Economics 2110, at The University of Tennessee. These concepts were listed with annotations as to page locations in the principal text for the course. Two other nationally used introductory texts were reviewed to determine the common use of these concepts.

The concepts which are introduced to the student in the first one-third of the course were then isolated and brief explanations written

for the concepts. These concepts were grouped into five clusters of content. Achievement tests of from 10 to 20 items were then written for each cluster in three parallel forms. These items were administered to Economics 2110 students in the Winter Quarter, 1976, in order to do an item analysis and develop two forms of tests for each cluster. A 40-item instrument was also established in two parallel forms during this same term for use in measuring terminal achievement of the independent-study groups and the large group of televised-lecture students.

In the Spring Quarter, 1976, volunteers for participation in independent study were solicited. From those volunteering random selections were made from both the morning and afternoon sections of the class. Selections of volunteers were made from each of the four morning sections who would be designated as the experimental text-readers. Volunteers from the afternoon sections were designated as the experimental nontext-readers.

Both groups were given a deadline for completion of all required work, including the quizzes assocated with the independent study. This deadline was the day prior to administration of the first regularly scheduled test for the large-group, televised-lecture students, hereinafter referred to as the control group. The instrument used for this test was the 40-item one that was developed in the previous quarter.

The *t*-test for significant differences of mean scores was used to compare the experimental groups against the control group and with each other. The Chi-square and *t*-test procedures were applied to grade point averages of the groups in order to determine equality of a background factor. From the results of this analysis of data, several findings

were made. Based on these findings, conclusions were drawn.

G. ORGANIZATION OF STUDY

This study is divided into six chapters and four appendixes. The first chapter is an introduction to the study and includes the statement of the problem, justification and an overview of the procedures used in the study. The second chapter is a review of related studies. The chapter is organized according to the purposes of these studies. The third chapter is a detailed description of the procedures used in the study. Chapter III contains the procedures for developing the measures of achievement. Chapter IV contains the procedures used for the experiment. Chapter V reports the analysis of data gained from the experiment. Chapter VI contains the findings, conclusions, and recommendations of the study.

Appendix A is a sample of the concept clusters. A sample of the achievement quizzes used during the experiment is contained in Appendix B. Appendix C is the written instructions, showing grading scales, which were given to each of the experimental groups. Appendix D contains the letter which was given to each student, asking for participation in the experimental program.

CHAPTER II

REVIEW OF RELATED STUDIES

A review of 14 related studies was made for three reasons. First, studies were reviewed that related to determining the current level of economic literacy among students of various academic pursuits, as well as the economic literacy of prospective teachers of introductory economics and individuals not associated with formal education. Second, a review was made of studies to determine the feasibility and practicality of the course of independent study for various subjects. Third, a review was made of studies on methods of construction of achievement tests.

Each section of this chapter contains reviews of those studies applicable to a particular purpose.

A. STATUS OF EDUCATIONAL ECONOMICS

Eight studies were selected to examine the level of economic literacy of several groups. If economic literacy levels were found to be low, then it would be apparent that traditional instructional methods were not meeting the task of educating for effective citizenship. All of the studies reported in this section did, in fact, report low levels of economic knowledges and understandings. Some form of study of instructional methods would, therefore, be justified.

Key Study[4]

In 1967 Key sought to study the level of knowledges and understandings acquired by students in collegiate elementary economics apposite to a selected macroeconomic problem. A sample of 687 students from 8 colleges was drawn. The specific macroeconomic problem was identified as inflation. Questionnaires and a check list were formulated and mailed to the appropriate instructors to determine and quantify the nature of individual instructor stress. A test was then devised to measure understanding in relation to the specific problem. The test was administered, analyzed via traditional item analysis methods, revised, and readministered. The test was thus upgraded to a reliability coefficient of .82, which presumes a locally reliable instrument.

Through analysis of variance and covariance, Key determined that students with prior exposure to courses in economics scored significantly higher than those who had not been so exposed. Key further found that students enrolled in courses in elementary economics in colleges located in a rural setting scored significantly lower than students enrolled in colleges located in urban settings. On the basis of these findings, Key recommended the immediate recognition of learning differences as well as the use of remedial programs to correct the discrepancies.

The Key study shows that extraneous factors such as general academic background and prior exposure to a course in elementary economics

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[4]Charles M. Key, "Evaluation of Knowledges and Understandings Acquired by Students in Collegiate Elementary Economics Apposite to a Selected Problem" (Unpublished Ph.D. dissertation, Indiana University, 1969).

may contribute to differences in learning. The possibility of such learning differences is one of the substantive reasons for this study.

Dietz Study[5]

Dietz studied the level of economic understanding of senior students in a sample drawn from high schools in California. The selected students represented approximately 3 percent of all high school students in the state. The level of economic understanding was to be analyzed in terms of 12 demographic student characteristics such as prior exposure to courses in economics and major area of study. Dietz constructed a test for measuring understanding in economics, which was validated by extensive submission to experts, including G. L. Bach and members of the National Task Force on Economic Education. The final version of the Dietz test possessed a reliability coefficient of .82.

Employing analysis of variance, Dietz found that the mean score for all students was 23.01 or a 55 percent level of understanding. As in the Key study, it was also found that students with prior exposure to courses in economics scored significantly higher than students not having had prior courses in economics. Dietz also found that students who had completed a course in general business scored significantly higher than those students not having had a course in general business. Other student characteristics such as prior grade averages and stated opposition to governmental intervention in the market place also explained or

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[5]James E. Dietz, "Economic Understanding of Senior Students in Selected California State Colleges" (Unpublished Ph.D. dissertation, University of California at Los Angeles, 1963).

contributed to significant differences in scores. From these findings Dietz recommended that more emphasis should be placed on economic education and that more tests for measuring student achievement should be developed. Dietz also recommended that educators should take note of the varying levels of economic understanding among students.

Dietz's last recommendation is of importance to this study. As students differ in their educational background, so do they differ in their levels of economic understanding, from which it may be inferred that they differ in terms of individual ability to learn.

Rutledge Study[6]

Rutledge pursued a slightly different approach in that he sought to evaluate the levels of economic understanding of selected high school seniors in the Atlanta, Georgia, public schools in contrast to established national norms. Rutledge sought to compare scores of students with prior exposure to courses in economics to scores of students not having a prior course in economics. Variables of socio-economic background and race were also examined by Rutledge for possible influence on test performance. A sample of 442 students was drawn from several high schools, which represented a sample of the 24 high schools in the population. Using a descriptive survey method, Rutledge then administered the standardized Test of Economic Understanding, which was used to establish the national norms. Data were also drawn from a student personal data sheet and the students' permanent school records. The data were treated

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[6]Walter E. Rutledge, "An Analysis of Economic Understanding of Selected High School Seniors in the Atlanta Public Schools" (Unpublished Ph.D. dissertation, Georgia State University, 1971).

by analysis of variance and other statistical methods such as the t-test for mean score differences.

Rutledge found that students having had a prior course in economics scored significantly higher than those not having had a course in economics. Rutledge also found that significant differences in economic understanding existed between students of differing socio-economic backgrounds as measured by the Minnesota Scale for Parental Occupation. In addition, he found that Caucasian students scored significantly higher than black students. Moreover, the sample as a whole indicated deficiency in economic understanding in relation to established national norms. Rutledge concluded from his findings that students do benefit from courses in economics with larger mean score gains evident in the lower socio-economic and black student groups.

With the diversity of students present at a large university, the message of Rutledge's study is readily apparent. A student from a very low socio-economic background cannot reasonably be expected to learn at a pace and in a fashion commensurate with other students of different backgrounds. Indeed, all students cannot be treated as being identical in terms of their learning abilities.

Marmas Study[7]

In 1961, Marmas dealt with the economic understanding of future teachers of social studies, business, and home economics, all of whom would presumably someday teach economics, in terms of their academic

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[7]James C. Marmas, "Teacher Preparation in Economics at California State Colleges" (Unpublished Ph.D. dissertation, Stanford University, 1961).

preparation, work experience, and mastery of economic content and theory. The test used for measuring economic understanding was the Economics Topics Test, which had a published reliability coefficient of .84. A questionnaire was also developed to obtain information pertinent to work experience. A sample of 181 college students was selected from three California colleges.

From the scores obtained therefrom and from permanent records data, Marmas found that all three types of students (social studies, business, and home economics) scored significantly higher than other teaching majors. Furthermore, Marmas found overall grade point average and grade averages in previous economics courses contributed to levels of economic understanding and that a direct, although weak, relationship existed between the number of courses taken in economics and the level of economic understanding.

Since the impact of courses in economics is cumulative, it is evident that a proper foundation for further learning be laid at the introductory level. The Marmas study presents a mandate for an effective method for instruction in the introductory economics course, another reason for an alternative to the large-group, televised method of instruction.

Garman Study[8]

As was the case in the Marmas study, Garman was also seeking to measure the level of economic understanding of teachers who would

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[8]Eric T. Garman, "Economic Literacy of Prospective Business Education Teachers" (Unpublished Ph.D. dissertation, Texas Technological University, 1969).

eventually be instructing in courses of economics. His procedure was similar to Marmas with the exception of the sampling procedure. Garman chose a large number of students from the local university, subdivided them according to 12 categories of personal data characteristics. The test employed for measuring economic understanding was again the Test of Economic Understanding. Treatment of the socre results was accomplished through use of analysis of variance, covariance, and nonparametric methods.

Garman found that men generally score higher than women and that students planning an early graduation, students with at least some work experience, and students with higher grade points generally score higher on the test. Two other findings are noteworthy for they indicate discoveries not in keeping with other, similar research studies. One such finding was that business education students preparing to teach score approximately the same as secondary school students. The other finding that is somewhat atypical is that students having had no prior exposure to courses in economics scored higher mean scores than students who have had prior courses in economics. These two differences may have resulted from somewhat questionable sampling techniques and treatment of the score data.

The Garman study is significant to this study in that it again shows the variability in economic understandings. The findings and conclusions form a basis for the statement that students differ in their ability to learn economics and their level of economic understanding.

Gable Study[9]

Gable sought to determine the actual level of economic understanding of a group of New York businessmen and to compare that level of understanding to the perceived level of economic understanding and to the subjective perception of the level of economic understanding of their contemporaries. A sample of 100 businessmen was selected from the World Who's Who in Commerce and Industry. Businessmen were interviewed for personal data and their perceptions of levels of economic understanding. The Test of Economic Understanding was the instrument used for measuring the level of economic understanding.

The sample members perceived their own level of economic understanding as being greater than the level of economic understanding of their peers. Moreover, no relationship between the actual, measured level of economic understanding of the sample members and the dominant value orientation of the sample was found. (The latter was a score value obtained from the DVL Study of Values Test, which indicated that the sample members weighed social, theoretical, and economic values more than religious and social values.)

The Gable study has limited applicability to this study due to the stratification of the sample by only the most successful businessmen. However, because many of the students at this university will become future businessmen, and it may be inferred that they will put heavy emphasis on economic considerations or values, it is important that these

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[9]Myron Gable, "The Value Orientations and Actual Perceived Level of Economic Understanding of New York Businessmen" (Unpublished Ph.D. dissertation, New York University, 1970).

students gain as much understanding of economic concepts as is possible. A high level of economic understanding not only contributes to the success of the individual but also contributes to increased efficiency of the economy's managerial resources.

Darrin Study[10]

The Darrin study is the one that most nearly parallels this study. In 1958 Darrin sought to identify those economic concepts that could be incorporated into existing social studies courses in the District of Columbia Laboratory Schools and to determine if students in grades kindergarten through 12 could effectively learn elementary economic concepts. A list of 28 selected concepts was drawn from the publication, Key Understandings in Economics. These concepts were then specified in a format appropriate for each grade level. An instructional package was prepared to accompany the concepts for each grade level. The experiment involved 47 teachers and 1,332 students, along with workshops, personal conferences, and check lists to insure maximum uniformity in the teaching of the concepts. At the end of the experimental period, the participating teachers were provided with a rating sheet designed to determine the effectiveness of the presentation.

The following conclusions were produced by the Darrin study. The effectiveness of teaching economic concepts increases as the grade level of the student increases. A total of 18 of the original 28 concepts were effectively learned at all levels.

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[10]Garvey L. Darrin, "Economics in the Elementary School Curriculum: A Study of the District of Columbia Laboratory Schools" (Unpublished Ph.D. dissertation, University of Maryland, 1958).

Darrin's study contributed to this study primarily in the specification of the economic concept. It would also appear from the Darrin study that particular care should be devoted to explanation of a concept in economics in a form appropriate for the grade level.

Ganser Study[11]

Ganser studied the level of economic understanding of undergraduate teaching majors. The samples of students were divided into the two groups of social studies majors and business education majors, with each sample divided into two classes comprised of freshmen and seniors. The Test of Economic Understanding was administered to all groups, and the data were treated via analysis of variance and covariance.

Ganser found that the social studies students tended to score higher than did the business education students, although not significantly. Moreover, no significant differences were found between the freshmen and senior groups, with all groups scoring lower than the established norms.

The studies so far reported establish that the status of educational economics is not good. The predominate method of instruction appears to be the lecture method. This method is not apparently making significant contributions to the level of economic understanding of students, teachers of economics, or businessmen. The abundance of studies dealing with the subject of economic understanding indicates that a relatively

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[11]Carl J. Ganser, "An Evaluation of the Understanding of Economic Concepts by Business Education and Social Studies Undergraduate Teaching Majors at Wisconsin State University--Whitewater" (Unpublished Ph.D. dissertation, University of Wisconsin, 1969).

high level of economic understanding is requisite to effective citizenship. It may be inferred, therefore, that educational economics requires an alternative method of instruction that will take cognizance of individual learning differences and effectively increase the individual's level of economic understanding.

B. FEASIBILITY OF INDEPENDENT STUDY

Five studies are reviewed in this section, each of which dealt with creation, implementation, and evaluation of independent study. The subject matter in each study varies and does not deal directly with the learning of economic concepts. If it could be shown that independent study techniques had proven successful in a number of unrelated subject areas, then it could be assumed that independent study was worth consideration for use in a course of elementary economics.

Curl Study[12]

Curl experimented with the use of self-instructional methods for learning the operations of certain types of camera and related photographic equipment. The sample of students consisted of a class of foreign students, all charged with learning the same operations concerning the equipment. Each student was provided with multimedia instructional devices, including slide presentations, programmed texts, etc. The students were then permitted to proceed in the learning of the operations

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[12]David H. Curl, "An Exploratory Study of A Self-Instructional Method for Teaching Equipment Operation" (Unpublished Ed.D. dissertation, Indiana University, 1961).

at an individual pace. As each student completed the course, he was tested for knowledges and understandings as well as performance abilities.

All students in the experiment scored the minimum acceptable levels of understanding and ability on both forms of measurement. From this finding Curl recommended implementation of this type of instruction for this course which had traditionally been instructed via the lecture method.

Beckham Study[13]

Beckham isolated two classes for the purpose of comparing the traditional method of lecture instruction in the subject of woodshop safety to a self-paced method of instruction. The experimental class was given multimedia materials and permitted to proceed through the materials at an individual pace. The control class proceeded through the course receiving instruction from a lecture method. At the end of the experimental period, both classes were tested for understandings gained.

Analysis of variance and mean score difference resulted in a finding that no significant difference existed between the group that received the lecture method and the group that learned the material via the self-paced method. However, because the self-paced method utilizes less manpower resources and entails less frustration on the part of the student, Beckham concluded that the self-paced method was more effective for learning. His recommendation followed that self-paced instruction be adopted for other courses.

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[13]Joe W. Beckham, "An Experimental Comparison of Self-Paced Instructional Materials Versus the Traditional Method in Teaching Woodshop Safety" (Unpublished Ph.D. dissertation, East Texas State University, 1969).

Oen Study[14]

A comparison of the traditional lecture-discussion type of method of instruction to the individualized method of learning was undertaken by Oen in 1969. A sample of students was chosen from 29 participating high schools across the state of Michigan. The traditional lecture-discussion method, the individualized approach method, and a noninstruction (control) method were identified as the base for evaluation. Each group was tested at the end of the experimental period.

The data were treated statistically via the analysis of variance and covariance techniques and these findings were made. Students learning in the lecture-discussion method scored significantly higher than students in the control group. Students in the individualized method scored significantly higher than students in the control group. However, students in the lecture-discussion group did not score significantly higher than students in the individualized method group. Oen then concluded that there is no significant difference between the lecture-discussion method of instruction and the individualized approach in terms of the understandings gained from the materials of the course.

Although further discussion will follow shortly, note is taken here concerning the absence of a significant difference between the two methods. Although the present study does not entail the creation of a programmed text or multimedia aids, it is individualized in the sense

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[14]Urban T. Oen, "An Experimental Study Designed to Evaluate the Effectiveness of an Individualized Learning Method of Instruction when Compared to the General Lecture Discussion Method of Instruction" (Unpublished Ph.D. dissertation, Michigan State University, 1970).

that a student participating in a course of independent study pursues the objectives of learning certain concepts in an individualized fashion.

Hedley Study[15]

The Hedley study represents another implementation and development of an alternative to the traditional lecture method. Hedley made her study to develop and evaluate programmed learning systems for use in the learning of selected operations of the IBM 402 Accounting Machine. After reviewing the literature concerning programmed learning in several unrelated fields, Hedley wrote the programmed text for use in learning the selected operations. The program was administered to two classes in punch card methods at The University of Tennessee, Knoxville.

Analysis of the data through percentage comparisons and nonparametric methods revealed several findings. There was no significant difference in the two classes concerning time rates, program errors, progress tests scores, and comprehensive final examination scores. (Programmed material was as effective as the conventional methods.) Moreover, the programmed learning method required 2.5 days less to cover the material compared to the conventional method. In excess of 90 percent of the students indicated that they were learning and that the material was easily understood. In excess of 80 percent of the students indicated that they could proceed through the material at their own pace and that this was important, particularly in terms of the material not being boring.

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[15]Martha K. Hedley, "Development of Programmed Instruction in Selected Basic Operations of the IBM 402 Accounting Machine" (Unpublished M.S. thesis, The University of Tennessee, 1963).

Klumph Study[16]

Klumph made a study to develop a model course of study for a senior high school office practice class. The model would be specified in the cognitive, affective, and psychomotor domains and would be constructed in behavioral terms. Klumph then undertook the construction of the model course of study and implemented it for a high school class of office practice. The class met for 45-minute periods, 5 days a week, for a full year. The objectives for each unit were then identified as to the appropriate domain of learning. The model was never evaluated as to its effectiveness nor contributions to learning in relation to a traditional lecture method, but Klumph nonetheless evaluated the model subjectively and determined that it was successful.

The Curl, Beckham, Oen, Hedley, and Klumph studies were all researched to evaluate the feasibility of alternative methods of instruction. It appears that nontraditional methods of instruction have been successfully developed and implemented in a variety of courses and subjects as well as a variety of learning domains. These studies are pertinent to this study in that they all represent departures from the lecture method of instruction. All appear to have been at least reasonably successful or, at minimum, equivalent to the traditional approach.

C. ACHIEVEMENT TEST CONSTRUCTION

Many of the afore-reported studies have referred to achievement test construction. Many of the principles of test construction and

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[16]Charles W. Klumph, "A Course of Study in Behavioral Terms for a Senior High School Office Practice Class" (Unpublished M.B.E. thesis, Indiana University of Pennsylvania, 1974).

evaluation were obtained therefrom. The one study reported in this section is the study that led to the current system of test construction utilized at The University of Tennessee, Knoxville.

Mundrake Study[17]

Mundrake sought to develop a procedure for developing test items for use in measuring student achievement in the Economics 2110 course at The University of Tennessee. Undergraduate and graduate assistants submitted at regular intervals test items in multiple-response form. These items were reviewed for form and content by Mundrake and a committee. The items were also reviewed by a jury of other economics professors. Once the items had been used in the course, they were analyzed through traditional item analysis, including difficulty and discrimination indices and reliability coefficients, for the instrument as a whole. Apposite data from each administration were recorded on cards for each item thus creating a test file of valid and reliable items.

The procedure is sound as used in the Mundrake study. The measurement of achievement for this course, as developed by Mundrake, has been maintained for the 3 years intervening between his study and the present study. This study contains item construction principles and evaluative techniques found in the Mundrake study.

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[17]George A. Mundrake, "Development of a Series of Multiple Choice Items for Evaluation of Student Achievement in Economics 2110 at The University of Tennessee" (Unpublished M.S. thesis, The University of Tennessee, 1973).

CHAPTER III

DEVELOPMENT OF CONCEPT STATEMENTS AND MEASUREMENT OF ACHIEVEMENT

In order to investigate the problem as stated at the beginning of this study, the following procedures were employed.

Identification of Concepts

Three well-known introductory economics texts were selected and reviewed. The concepts that are covered in the introductory economics course at The University of Tennessee were listed. The economic concepts were identified in the form of "key" words or phrases. The basic text used was Economics: Principles, Problems, and Policies by Campbell R. McConnell for the first course in economics at The University of Tennessee. The other texts were reviewed to determine whether these concepts were common to them. Table I on page 26 shows the page locations of the concepts for the three basic texts.

Since this study is limited to the first one-third of the course, the concepts selected for this portion of the course are indicated in Table I. The Concept Clusters were identified and numbered as follows:

I. The Concepts of Economics and the Role of the Economist: Ways and Means of the Science

II. The Concept of a System of Production: Transformation of Resources into Goods and Services

III. The Concept of Capitalism: Production under a Free Enterprise System

TABLE I

CONTENT COMPARISON OF ELEMENTARY ECONOMIC CONCEPTS IN THREE SELECTED INTRODUCTORY ECONOMICS TEXTS

Key Word or Phrase	Concept Cluster	Text		
		McConnell[1]	Spencer[2]	Heilbroner/ Thurow[3]
Economic abstractions	I., B.2	7		68
Economic generalizations	I., B.1	7		
Economic theories	I., B	6	5	
Economic principles	I., B	6	5	
Economic models	I., E	6	6	
Ceteris paribus	I., B.1	6		58
Graphical analysis	I., D	7	14	61
Economic goals of American capitalism	I., F	11	23	653
Growth		11	289	296
Full employment		11	148	486
Price stability		11	269	523
Economic freedom		12		
Equality in income distribution		12	69	244
Economic security		12		
Fallacy of composition	I., I	14	10	64
Cause and effect	I., J	16	11	691
Ad hoc ergo propter hoc	I., J	16	11	
Role of expectations	I., K	16		72
Economic wants	II., A	21	25	36
Resources	II., B	22	18	540
Economics defined		24	4	33
Underemployment	II., F.2	26	611	
Unemployment	II., F.1	26	148	321
Production possibilities	II., G	26	26	40
Production possibilities curve	II., G	27	26	40

TABLE I (continued)

Key Word or Phrase	Concept Cluster	Text: McConnell[1]	Text: Spencer[2]	Text: Heilbroner/Thurow[3]
Optimum product mix		27		
Law of increasing costs		28	27	40
Opportunity costs	II., G.1.a.	28	376	41
Private property	III., A.1	40	33	
Freedom of enterprise	III., A.2	40	101	
Self-Interest	III., A.3	40	33	26
Competition	III., A.4	41	34	55
Comparative advantage	III., A.4.a.	44	563	557
Role of money	III., A.5	46	22	459
Barter		48	22	
Coincidence of wants		48	147	
Circular flow of models	III., E.2	48	41	286
Demand		54	47	47
Law of demand		55	49	
Change in demand		58		100
Change in quantity demanded		55		
Demand curve		55	47	37
Price and quantity demanded relationship		55	48	53
Individual demand		57		50
Market demand		57	49	
Determinants of demand		58		
Supply		60	53	47
Law of supply		61	53	
Change in supply		63	54	100
Changes in quantity supplied		62	53	53
Supply curve		63	53	53
Price and quantity supplied relationship		61		
Determinants of supply		63		

TABLE I (continued)

Key Word or Phrase	Concept Cluster	Text		
		McConnell[1]	Spencer[2]	Heilbroner/ Thurow[3]
Market equilibrium		64	469	100
Equilibrium quantity		67	57	
Equilibrium price		67	57	52
Relationships of changes in demand and supply on equilibrium price and quantity		67		
Substitution effect	IV., A.2	75	51	113
Normal profit	IV., D.1	76	377	
Economic or pure profit	IV., D.2	76	377	136
Consumer sovereignty	IV., E	77	58	201
Derived demand		77	446	228
Price and distribution of price		79	373	86
Economic functions of government	V., A	90	35	415
Monopoly	V., C.1	91	42	174
Natural monopoly	V., C.2	91	415	179
Spillovers (externalities)	V., E.1	93	102	212
Social goods	V., F.1	96	100	
Functional distribution of income		108	64	
Personal distribution of income		108	71	
Income and productivity relationship		111		245
Savings function		113	170	349

TABLE I (continued)

Key Word or Phrase	Concept Cluster	Text: McConnell[1]	Text: Spencer[2]	Text: Heilbroner/Thurow[3]
Consumption		115	168	374
Business forms		118		198
Legal forms of business		119	81	
Sole proprietorship		120	82	
Partnership		120	82	
Corporation		120	82	
Gross National Product		153	123	286
Expenditure approach to GNP		162	132	
Income approach to GNP		166	132	
Net National Product		168	134	342
National Income		169	133	
Personal Income		169	137	
Disposable Income		170	137	363
Inflation		177	149	496
Business cycles		185	142	316
Monopolistic competition		399	430	183
Oligopoly		401	434	179
Monopsony		402	456	176
Oligopsony		402		
Elasticity of demand		410	338	105
Total revenue test		413	343	
Perfectly inelastic demand		412	340	
Perfectly elastic demand		412	340	
Elasticity of supply		416	338	105

TABLE I (continued)

Key Word or Phrase	Concept Cluster	Text		
		McConnell[1]	Spencer[2]	Heilbroner/ Thurow[3]
Demand to imperfectly competitive seller		426		
Average revenue		427		157
Total revenue		428		146
Marginal revenue		428		144
Law of diminishing marginal utility		423	360	37
Utility maximizing rule		434		34

[1]Campbell R. McConnell, Economics: Principles, Problems, and Policies, Fifth Edition (New York: McGraw-Hill, 1972).

[2]Hilton H. Spencer, Contemporary Economics, Second Edition (New York: Worth Publishers, Inc., 1974).

[3]Robert L. Heilbroner and Lester C. Thurow, The Economic Problem, Fourth Edition (Englewood Cliffs: Prentice-Hall, Inc., 1975).

IV. The Concept of a Price System: Prices and the Free Enterprise System

V. The Concept of a Mixed Capitalistic System: Introduction to the Role of Government

Development of Concept Explanations

Each concept was then divided into subconcepts and a paragraph of explanation written for each. From 10 to 15 paragraphs for each concept cluster were prepared. See Appendix A for selected examples.

Development of Concept Cluster Quizzes

Quizzes were used to measure achievement on each of the clusters. Each question was written in three multiple-choice forms. Two of the three with the best difficulty and discrimination would later be chosen for use in the experiment.

Quizzes varied in length according to the volume of content to be covered. The longest quiz was 20 items, and the shortest quiz was 10 items.

The first major goal was to administer the three versions of each Concept Cluster Quiz in order to obtain data for an item analysis. Two different Concept Cluster Quizzes were given in each section on the next class meeting following Test I which had covered the content of all five clusters.

To provide student motivation to perform well on an instrument for which no credit can be earned, the students were informed that one weight point would be added to their final weight point accumulation for

taking the Concept Cluster Quiz.[18]

Item Analysis of Concept Cluster Quizzes

A General Purpose Optical Scan Form was the medium used for responding to items in the Concept Cluster Quizzes. The answer sheets were read and analyzed by a Sentry 70 series computer housed in the Tennessee State Testing and Evaluation Center. One form of output from this process were printouts of names, social security numbers, and raw scores. These data were punched onto cards for storage.

Another form of output from the scoring process was in the form of tallies for each response per item, stored on magnetic tape. A source program, stored in an IBM OS 360/65 computer, generated a talley report per response, per item for the upper and lower 27 percents of scores.

This program further generated the difficulty and discrimination indices for each item as well as the frequency of choice for each response for both the upper and lower samples. Table II on page 33 reports these statistics for each of the Concept Cluster Quizzes, in each of the three forms administered. Reading the table in a horizontal fashion, the parallel forms of each item are reported under the headings of Form A, B, C.

Preparation of Alternate Forms

Two forms were prepared by selection of the best questions from the three forms that would provide a total difficulty index that would

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[18] A later analysis of final letter grades assigned in the course revealed no change in the overall distribution of grades from the previous quarters.

TABLE II

ITEM ANALYSIS BY CLUSTER
AND ALTERNATE FORMS

		Form					
		A		B		C	
Cluster	Item	Diff.	Disc.	Diff.	Disc.	Diff.	Disc.
I.	1	.500	.500	.741	.296	.733	.533
	2	.708	.500	.389	.185	.433	.600
	3	.667	.333	.833	.111	.833	.333
	4	.729	.292	.648	.407	.767	.200
	5	.458	.083	.370	.593	.533	.400
	6	.813	.292	.852	.148	.967	----[a]
	7	.625	.250	.259	.259	.767	.333
	8	.604	.458	.444	.370	.867	.133
	9	.604	.458	.519	.667	.900	.067
	10	.417	.417	.130	.037	.833	.200
II.	1	.688	.625	.804	.043	.676	.204
	2	.469	.563	.870	.174	.765	.235
	3	.906	.188	.413	.391	1.00	----
	4	.750	.250	.739	.261	.735	.412
	5	.906	.188	.826	.087	.794	.294
	6	.750	.500	.783	.435	.676	----
	7	.438	.500	.674	.130	.824	.118
	8	.813	.250	.913	.174	.941	.118
	9	.781	.313	.543	.217	.912	.176
	10	.938	.125	.891	.217	.941	.118
	11	.594	.563	.717	.391	.588	.706
	12	.969	.063	.630	.478	.794	.412
	13	.875	.250	.326	.304	.853	.294
	14	.813	.250	.804	.391	.765	.471
	15	.719	.438	.783	.261	.794	.176
III.	1	.857	.143	.409	.455	.964	----
	2	.571	.571	.727	.545	.571	.143
	3	.750	.214	.591	.455	.643	----
	4	.857	.286	.682	.636	.537	.357
	5	.714	.429	.409	.636	.643	.286
	6	.571	.714	.818	.364	.321	.214
	7	.893	.214	.455	.182	.679	----
	8	.643	.143	.636	.182	.679	----
	9	.750	.500	.591	.636	.429	.286
	10	.571	.429	.545	.727	.893	.214
	11	.429	.571	.318	.455	.357	.714
	12	.464	.786	.591	.455	.535	.643
	13	.679	.643	.591	.455	.464	.214
	14	.857	.286	.773	.455	.500	.286
	15	.643	.571	.545	.727	.464	.357

TABLE II (continued)

Cluster	Item	Form A Diff.	Form A Disc.	Form B Diff.	Form B Disc.	Form C Diff.	Form C Disc.
IV.	1	.526	.316	1.00	----	.846	----
	2	.947	.105	.848	.130	.808	.231
	3	.316	.421	.652	.435	.615	.308
	4	.447	.368	.500	.391	.385	.308
	5	.184	.158	.935	.130	.692	----
	6	.658	.474	.630	.317	.538	.462
	7	.711	.474	.543	----	.692	.462
	8	.605	.474	.478	.087	.731	.385
	9	.895	.211	.717	.301	.654	.538
	10	.658	.263	.630	.217	.808	.231
V.	1	.909	.182	.900	.200	.778	.440
	2	.773	.091	.800	.400	.611	.778
	3	.864	.273	.700	----	.444	.667
	4	.864	.273	.150	.100	.500	.333
	5	.909	.182	.950	.100	.722	.556
	6	.773	.445	.600	.400	.934	.111
	7	.773	.455	.650	.500	.556	.667
	8	.864	.273	.600	.400	.833	.333
	9	.318	.455	.350	.700	.556	.889
	10	.727	.182	.800	.200	.667	.444
	11	.409	.455	.500	.600	.444	.444
	12	.636	.364	.400	.600	.556	.667
	13	.318	.636	.550	.700	.444	.889
	14	.818	.364	.350	.500	.389	.778
	15	.409	.455	.500	.400	.556	.444
	16	.818	.364	.650	.500	.722	.333
	17	.591	.818	.500	.600	.500	.778
	18	.500	.455	.500	.400	.611	.333
	19	.682	.273	.750	.500	.778	.444
	20	.682	.091	.350	.300	.889	.222

[a]Indicated zero or negative discrimination for item.

be somewhat equal. Therefore, two of each of the three items per Concept Cluster Quiz was chosen based on the difficulty index. Any item with zero or negative discrimination, however, was not used.

These pairs constituted the items which would be formed into Concept Cluster Quizzes, Forms X and Y, for use in the experiment. A mean difficulty index was computed for each form of each Concept Cluster Quiz. Then, by adjusting the item from X to Y and vice versa, the difference in the mean figures was minimized. The pairs chosen for final use are shown in Table III, page 36.

Establishment of Achievement Measures

During the quarter prior to the experiment, the normal performances were established in alternate forms of the test which would measure the achievement of the first one-third of the economics course. The two forms were of the same difficulty and covered the same content.

On the second class meeting, Form A of a 40-item multiple-response test was given to the morning sections of students. The afternoon sections were given Form B. The assumption was made that due to the very large numbers of students enrolled in the morning and afternoon sections and the random method by which this institution assigns students to these sections, the sections would be equal in terms of any variable that could relate to learning. From this assumption it was inferred that if the morning and afternoon sections did not score significantly different, then the two forms must be equivalent in terms of difficulty. Thus, a *t*-test was applied to the pretest scores for the morning versus the afternoon scores. Table IV, page 38, shows the results of this

TABLE III

ITEMS SELECTED BY CLUSTER AND FORM

		Form			
		X		Y	
Cluster	Item	Diff.	Source[1]	Diff.	Source
I.	1	.741	B	.733	C
	2	.433	C	.389	B
	3	.833	B	.833	C
	4	.729	A	.767	B
	5	.533	C	.458	A
	6	.852	B	.813	A
	7	.625	A	.767	C
	8	.604	A	.444	B
	9	.519	B	.604	A
	10	.417	A	.130	B
Average Diff.		.522		.593	
II.	1	.688	A	.676	C
	2	.469	A	.765	C
	3	.413	B	.906	A
	4	.735	C	.739	B
	5	.794	C	.826	B
	6	.750	A	.783	B
	7	.438	A	.674	B
	8	.813	A	.913	B
	9	.543	B	.781	A
	10	.938	C	.941	A
	11	.594	A	.588	C
	12	.630	B	.794	C
	13	.875	A	.853	C
	14	.804	B	.765	C
	15	.783	B	.719	A
Average Diff.		.700		.765	
III.	1	.409	B	.857	A
	2	.571	A	.571	C
	3	.750	A	.591	B
	4	.536	C	.682	B
	5	.643	C	.714	A
	6	.321	C	.571	A
	7	.893	A	.455	B
	8	.636	B	.643	A
	9	.429	C	.591	B
	10	.545	B	.571	A
	11	.318	B	.357	C

TABLE III (continued)

Cluster	Item	Form X Diff.	Form X Source[1]	Form Y Diff.	Form Y Source
	12	.464	A	.536	C
	13	.591	B	.464	C
	14	.500	C	.773	B
	15	.545	B	.464	C
Average Diff.		.543		.589	
IV.	1	.846	C	.526	A
	2	.848	B	.808	C
	3	.652	B	.615	C
	4	.447	A	.385	C
	5	.692	C	.935	B
	6	.630	B	.538	C
	7	.711	A	.692	C
	8	.605	A	.731	C
	9	.717	B	.654	C
	10	.658	A	.630	B
Average Diff.		.680		.651	
V.	1	.778	C	.900	B
	2	.773	A	.611	C
	3	.700	B	.444	C
	4	.150	C	.500	B
	5	.722	C	.909	A
	6	.773	A	.600	B
	7	.556	C	.650	B
	8	.864	A	.833	C
	9	.318	A	.350	B
	10	.667	C	.727	A
	11	.444	C	.409	A
	12	.556	C	.636	B
	13	.444	C	.318	A
	14	.389	C	.350	B
	15	.500	B	.556	C
	16	.650	B	.722	C
	17	.500	B	.500	C
	18	.500	B	.500	A
	19	.750	B	.682	A
	20	.682	A	.889	C
Average Diff.		.585		.605	

[1]Source indicates form the item was drawn from; see Table II, page 33.

TABLE IV

PRETEST AND POSTTEST RESULTS IN PILOT ADMINISTRATION

Statistic	Pretest[1]		Posttest[2]	
	Form A*	Form B#	Form A#	Form B*
N	392	202	202	392
$\overline{X}$	13.69	15.31	25.72	25.77
s	4.279	4.263	6.050	6.325

*Morning classes

#Afternoon classes

[1] t value on pretest comparison = 1.315 (not significant at .10 level).

[2] t value on posttest comparison = 0.096 (not significant at .10 level).

analysis. No significant difference was found between morning and afternoon pretest scores at the .10 level. Therefore, Forms A and B were judged to be of equal difficulty as a pretest.

This conclusion was reinforced by the administrations of these two forms as posttests. The morning sections were given Form B and the afternoon sections were given Form A. The posttest scores were analyzed using the t-test. Table IV, page 38, reports the results of this analysis. Again, no significant difference was found.

In order to measure the learning which took place between the pretest and posttest and to test the proposition that Test I in its two forms possessed the ability to measure this change, a t-test was applied to all students' scores. Table V on page 40 shows the result of the procedure which demonstrates a significant difference between the pretest and the posttest scores. This result was consistent with the stated expectation and evidences the ability of Forms A and B to measure changes in learning, regardless of which is used as the pretest or posttest.

However, since the morning and afternoon distinctions would be made in the experiment, these aforementioned questions were further applied to each group. That is, the t-test procedure was applied to the morning pretest scores versus the morning posttest scores and the afternoon pretest scores versus the afternoon posttest scores. The morning sections had a pretest mean score of 13.618 and a posttest mean score of 25.770. Comparing these two means, a t-value of 17.808 was found, which was significant at the .01 level. The afternoon sections had a pretest mean of 15.306 and a posttest mean score of 25.719. Comparing these two means produced a t-value of 12.667, which was also significant at the .01

TABLE V

PRETEST AND POSTTEST RESULTS IN PILOT ADMINISTRATION
COMBINED A AND B FORMS

Statistic	Pretest	Posttest[1]
N	594	594
$\overline{X}$	14.07	25.33
s	4.325	6.445

[1] *t*-value on pretest-posttest comparison = 21.890 significant at .01 level.

level. The instrument, therefore, again demonstrated that both morning and afternoon sections did significantly improve.

CHAPTER IV

CONDUCT OF EXPERIMENT

This chapter contains the procedures used in the experiment. The experiment began on the second regularly scheduled day of classes of the Spring Quarter and concluded 20 days later on April 20, 1976.

Selection of Participants

A letter outlining the experimental program for the student was prepared and distributed to all students on the first day of class of Spring Quarter, 1976. This letter contained a place for the student to indicate a desire to participate in the experiment. Those students desiring to participate completed the lower portion of the letter and handed it to the section proctor. Table VI on page 43 shows a total of 209 students volunteered.

A selection of 57 names was then made from the four morning sections, and a selection of 47 names was drawn from the four afternoon sections. The procedure for choosing volunteers was to pick every other card from the alphabetized deck of volunteers. Students who were to participate in the study were then notified. Table VI shows the enrollment, the number of volunteers, and the number selected for each section.

No volunteers were chosen from section 8 as they met at a different time and would necessitate a third hour each day for testing.

Initiation of Experiment--Morning

At the second class meeting, those students selected for participation were asked to report to a designated room in the undergraduate

TABLE VI

SELECTION OF PARTICIPANTS IN EXPERIMENTAL GROUPS

Section	Total Enrollment	Number of Volunteers	Number Selected
1	202	56	28
2	143	30	15
3	62	16	8
4	199	32	16
Morning Totals	606	124	57
5	63	22	11
6	88	16	9
7	128	30	27
8	87	17	0
Afternoon Totals	366	85	47
Grand Totals	972	209	104

library. The students selected from the morning sections were given a set of instructions (see Appendix C) and a set of the Concept Clusters. Students were instructed as to the termination date of the experiment at the close of 3 weeks, the purpose of the Concept Clusters, and how to utilize them in conjunction with the assigned text readings. These students were told that after completing the assigned readings and appropriate Concept Cluster, a quiz would be taken. This quiz would be offered at the same location from the hours of 10:00 a.m. until 10:50 a.m., Monday through Friday. The students were told that a score sufficient for a letter grade of C was required on each quiz; and if a minimum score of C was not achieved, another form of the test must be taken. For letter grades of C or better, the student could elect to retake the quiz one time; the second score would replace the first. Thus, each student was advised that a minimum of five quizzes and a maximum of ten quizzes could be taken during the program. Each student then completed the Control Sheet and was advised as to proper maintenance of this record.

The students were also informed that they would take the same first test as all other students (i.e., Test I). They were assured that the average of their five quiz grades would be used if it were higher than the score earned on Test I, and vice versa. This procedure was used to encourage the experimental students to perform as well as possible.

This group of experimental students would be reading both the Concept Clusters and the regularly assigned textbook readings. Therefore, this group of students was denoted <u>experimental text-readers</u>.

Initiation of Experiment--Afternoon

The students from the afternoon sections were given essentially the same instructions as the students from the morning sections with these exceptions. The students from the afternoon sections were instructed not to read the assigned text material. That is, they were told to read only the Concept Clusters and take the appropriate quizzes. The same rules applied concerning earning minimum letter grades on each quiz. However, if an afternoon student failed to achieve a minimum C score on any quiz, he/she did not at that time repeat the material and quiz. Instead, the student continued until all five quizzes had been taken. A deadline was given for completion of all five quizzes. The Testing Center was open Monday through Friday, from the hours of 2:20 p.m. until 3:05 p.m. for these students. After April 9, the student could repeat those quizzes if he chose to but only after reading the textbook material. Table VII on page 46 shows the numbers of morning students who took each quiz on a daily basis, and Table VIII on page 47 shows this same information for the afternoon students.

This group of students was denoted as nontext-readers.

Testing and Records Maintenance

The Testing Center was located in the undergraduate library in a well-lighted and sound proof room. Upon entering the Testing Center, the student requested his Control Sheet and the appropriate quiz. After providing the date, quiz and reading times on the Control Sheet, the student marked his/her quiz and returned it for grading. The quiz was graded in the presence of the student and in many instances an explanation was given for incorrect answers.

TABLE VII

TESTS TAKEN PER DAY FOR EXPERIMENTAL TEXT-READER

Date	Cluster										Daily Totals
	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y	
April 1	1										1
2	25	2									27
5	7	11	6		1						25
6	3	1	6								10
7	2	1	13	2	5						23
8			4		1		3				8
9	4		7	1	11		2		1		26
12	3		6		11		10				30
13	1	3	2	2	7		5		1		21
14			6	1	6	4	11		7		35
15		1		1	9	2	6		2		21
19					1	2	15	1	16		35
20							1		22	5	28
Totals	46	19	50	7	52	8	53	1	47	5	

TABLE VIII

TESTS TAKEN PER DAY FOR EXPERIMENTAL NONTEXT-READER

Date	Cluster										Daily Totals
	1X	1Y	2X	2Y	3X	3Y	4X	4Y	5X	5Y	
April 1	14										14
2	24		11								35
5	7		19		9		1				36
6	1		8		9		3		1		22
7	1		7		21		17		3		49
8			1		7		16		10		34
9					1		9		31		41
12		4		1			1		1		7
13		1				1					2
14		2		2		1			1		6
15		1		1		1		1			4
19				2				2		1	5
20				1							1
Totals	47	8	46	7	47	3	47	3	47	1	

At the end of each day, the scores and weight points earned by each student were punched on that student's card. A printout was made on an IBM 403 Accounting Machine, which showed the progress in terms of scores and weights earned for all students up to that point. In this manner, students who were falling behind could be identified and encouraged to stay current.

CHAPTER V

COMPARISON OF ACHIEVEMENT

This chapter is divided into three sections. The first is a comparison of the scores earned by the experimental and control groups on Test I. The second section concerns times spent on assignments. The data were analyzed to determine if the success of the experimental students was due to a large amount of time spent reading. The third section of this chapter deals with an analysis of grade point averages. Grade point averages of the participants were examined to determine if the experimental students and the control students were the same.

Comparison of Test Scores

At the close of the first 3 weeks of the term, all students in the Economics course took a 40-item multiple-response test, which had been standardized in the previous quarter. This test was administered in two parallel forms which had been established as equally difficult.

Table IX on page 50 shows that the mean score for the experimental text-readers was 27.04, and the mean score for the experimental nontext-readers was 22.05. The *t*-value for this comparison was found to be 3.876. Therefore, the difference in means was significant at the .05 level in favor of the experimental text readers.

The mean score for the experimental text-readers was 27.04, and the mean score for the morning sections of the control group[19] was 23.92.

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[19]The morning sections were the sections from which the experimental text readers were selected.

TABLE IX

RESULTS OF TEST I FOR EXPERIMENTAL AND CONTROL GROUPS

	Experimental			Control		
Statistic	Text Readers	Nontext Readers	Combined	Morning Sections	Afternoon Sections	Combined
$\bar{X}$	27.04	22.05	24.91	23.92	24.92	24.26
s	6.263	5.868	6.563	6.053	6.352	6.177
N	50	42	92	527	293	820

The t-value for this comparison was 23.456. Therefore, the difference in means was significant at the .05 level in favor of the experimental text-readers.

The mean score for the experimental nontext-readers was 22.05, and the mean score for the afternoon sections of the control group was 24.92. The t-value for this comparison was found to be -2.756. Therefore, the difference in means was significant at the .05 level in favor of the afternoon sections of the control group.

The mean score for the experimental text-readers was 27.04, and the mean score for the entire control group was 24.26. The t-value for this comparison was found to be 3.08. Therefore, the difference in means was significant at the .05 level in favor of the experimental text-reader group.

The mean score for the experimental nontext-readers was 22.05, and the mean score for the entire control group was 24.26. The t-value for this comparison was found to be -2.270. Therefore, the difference in means was significant at the .05 level in favor of the entire control group.

Time on Assignments

For the experimental group, each student recorded the time spent on the assignments on the Control Sheet each time a quiz was taken. For the control group, one section was asked to estimate time spent during the previous week in reading the assigned material. The accumulations of these time estimates for the 3 weeks were made. These figures may not be representative because only 27 students of about 150 were present each of the 3 weeks when time estimates were requested.

Table X on page 53 shows the data for each experimental group.

The highest mean hours was 13.68, which was the mean hours for the experimental text-readers. This reflects the additional reading tasks (i.e., the Concept Clusters). The next highest mean hours was 9.54 hours for the control group. The time estimate is for the control students who read only the normally assigned materials. The lowest mean time was 8.95 for the experimental nontext-readers. These students were required to read only the Concept Clusters.

Analysis of Grade Point Averages

Because differences were found between some groups in terms of performance on the same instrument, the possibility or presence of a group of abnormally high or low achievers in the experimental samples was investigated. Therefore, overall grade point averages for all experimental students were obtained. Then, overall grade point averages were obtained for selected control students. The control students for whom grade averages were obtained were chosen at random but in a number equal to the number of students from each section who were participating in the experiment. For example, section 1 had 28 students participating; therefore, 28 control students from that section were chosen, and so forth. No students from section 8 were participating in the experiment; therefore, no students from that section were selected for this analysis.

Two procedures were employed to analyze these data. The nonparametric technique of Chi-square was used first. A 2-by-5 contingency table was constructed with the first column's interval being 0.00 to 2.00 and the remaining columns being incremented by .50. The frequencies for experimental and control students were then cast in the appropriate cells.

TABLE X

TIMES SPENT IN READING FOR CONTROL AND EXPERIMENTAL GROUPS

	Control	Experimental Text-Readers[1]	Experimental Nontext-Readers[2]
Total Hours	248	684	420.5
Mean Hours	9.54	13.68	8.95
N	27	50	42

[1]Students reading both Concept Clusters and text.

[2]Students reading only the Concept Clusters.

The computed value of the Chi-square statistic was found to be 6.9. This value was not significant at the .05 level.

The *t*-test was also applied to these data. The mean grade point average for the experimental students was 2.63, and the mean grade point average for the control students was 2.54. The *t*-value for this comparison was -.234. Therefore, the difference in means was not significant at the .05 level. Both the Chi-square analysis and the *t*-test analysis support the conclusion that the experimental participants and the control students were drawn from the same population with respect to the measured characteristic, grade point averages.

CHAPTER VI

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The problem of this study was to identify and explain selected elementary economic concepts and to develop achievement tests for use in measuring student learning in a system of independent study. The goal was to develop and study the feasibility of an alternative to the large-group, televised-lecture format of instruction.

Concepts which are introduced in the first one-third of the course, Economics 2110, were isolated, established as being representative of elementary economic concepts in two other major elementary economics texts, and then grouped in a logical order by placing them in clusters according to a central topic. Two parallel forms of a 40-item multiple-response test were then standardized for use as a final achievement measure. Selected volunteers were permitted to proceed through the first one-third of the course by not attending class and undergoing a different study and testing procedure. One group was instructed to read the concept explanations in conjunction with the basic text and another group was instructed to read only the concept explanations. At the conclusion of the experiment, the independent study students took the previously mentioned test along with the control students. Comparisons of performance on this test were then made. Investigations were also made into grade point averages of both the independent study students and control group students and times spent in study.

A. FINDINGS

The following are the major findings of this study:

1. The experimental text-readers' mean score of 27.04 was significantly higher than the experimental nontext-readers' mean score of 22.05, at the .05 level.

2. The experimental text-readers' mean score of 27.04 was significantly higher than the morning sections' control group's mean score of 23.92, at the .05 level.

3. The experimental nontext-readers' mean score of 22.05 was significantly lower than the afternoon sections' control group's mean score of 24.92, at the .05 level.

4. The experimental text-readers' mean score of 27.04 was significantly higher than the control group considered as a single group mean score of 24.26, at the .05 level.

5. The experimental nontext-readers' mean score of 22.05 was significantly lower than the control group considered as a single group mean score of 24.26, at the .05 level.

6. The experimental text-readers spent the most time in reading. The control students spent the next highest amount of time in reading. The experimental nontext-readers spent the least amount of time in reading.

7. No significant difference was found in the overall grade point averages of experimental and control group students, at the .05 level.

B. CONCLUSIONS

Based on the foregoing findings, the following conclusions are drawn:

1. Students reading concept explanations and textbook materials in independent study with regular quizzes excel over students in large classes with no intermediate quizzes. (Findings 2 and 4)

2. Students reading concept explanations and textbook materials in independent study with regular quizzes excel over students who read only concept explanations. (Finding 1)

3. Students in large classes with no intermediate quizzes excel over students in independent study who read only concept explanations and have regular quizzes. (Finding 5)

C. RECOMMENDATIONS

The following recommendation is based on the findings and conclusions of this study:

1. Students should be given a choice on enrollment in the principles of economics course to take independent study under the plan that was successful in this study instead of attending larger lecture sections.

The following recommendations are made for further study:

1. That the remainder of the course in principles of economics be developed for independent study and then materials tested in the same manner as was successful in the present study.

2. That a study be made of retention effects of this plan of independent study.

3. That this study be replicated with the concept explanations and textbook assignments with at least three times the number of students to check on efficiency and cost of the operation as well as maintenance of the terminal achievement.

The writer invites requests for copies of the Concept Clusters, Cluster Quizzes, or 40-item achievement tests. Samples of the 40-item achievement tests are not included in this study because these items are currently active in the testing program.

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APPENDIXES

APPENDIX A

SAMPLE OF CONCEPT CLUSTERS

II. The Concept of a System of Production: Transformation of Resources into Goods and Services

Reading Assignments

McConnell	-- pp. 21-37
Issues	-- #2, pp. 6-8, #3, pp. 8-11, #4, pp. 11-14
Getting Started	-- pp. 27-28, 97-109, 90-92, 88-90, 32-35

A. In earlier material, we learned that the economist is concerned with economic facts. One such economic fact is that everyone has economic wants (and needs).

A.1 As individuals, we all have economic wants. A college education, a new car, clothing, vacations, etc., all represent examples of economic wants.

A.2 Society as a whole also has economic wants. Stable prices and high levels of production are good examples of societal wants.

A.3 Economists also recognize that we may think of as a truism concerning these economic wants, either individual or societal. That truism is that economic wants are insatiable (i.e., unlimited).

B. If satisfaction of economic wants comes from goods and services, then you may well ask, from where do the goods and services come? The answer is a system of production. And, for any system of production, there must be available, by definition, resources, which we may think of as the inputs to the production system.

B.1 Resources may be classified as to type. One type is property resources. These economic resources include land, raw materials, and capital.

B.1.a These economic resources also include free goods, which can be employed somehow in the production process.

B.2 Resources can also be classified as human. The term, labor, is frequently used to refer to this economic resource, but carries a broad definition when used in this sense.

B.2.a Economists also recognize entrepreneurial ability as an economic resource. The absence of entrepreneurial ability

is the number one reason for failure of small businesses in our economy. The entrepreneur's function as a bearer of risk is vital to an economic system such as is found in the United States.

C. Utilization of resources in the production process brings to the owner of a resource an income. Thus, resources could be classified according to the type of income derived from their utilization.

C.1 Income derived from use of property resources is known as rental and interest income.

C.2 Income derived from utilization of labor is called wages, which includes salaries.

C.3 Income to the entrepreneur is referred to as profits, which by definition can be negative.

D. Taken together, these resources are collectively referred to as the factors of production. We may now recognize another economic fact. Resources--any resources--are limited. Economists have labeled this characteristic as scarcity.

E. Given that economic wants are unlimited and that economic resources are limited, it would appear that we, as society, have a problem. And, indeed we do. This statement is called the economizing problem. Economics and the economist are directly concerned with the way society uses its limited resources in the production of goods and services to satisfy unlimited economic wants.

E.1 The concept of efficiency is the study of the way scarce resources are used in the production process. At one point in history, American farmers were able to produce only 100 bushels of corn per acre. With improvements in agronomy, we are able to produce 250 bushels per acre today. Would you say that the farmer is producing more efficiently? Do not answer too quickly. Remember, increases in production alone do not signify increases in efficiency. In this case, efficiency would have increased only if the farmer were using the same amount of resources in both periods of time.

F. Given that humans are an economic resource, assume that some people are not working. Is society utilizing this resource efficiently? Clearly, the answer is no.

F.1 An individual who is willing to work but is not working is labeled with a term with which you are quite familiar. The potential worker is called unemployed.

F.2 However, consider the worker who is employed but is working with tools that are less productive than tools that are available. He is underemployed. This problem of disguised unemployment is one of those economic facts that are tremendously difficult to measure and deal with.

F.3 Both of these terms refer to economic inefficiency. The former treats nonefficient use of a resource from a societal approach. The latter treats nonefficient use of a resource from an individual approach.

G. By making certain simplifying assumptions, the economist can examine this concept of efficiency more closely through an analysis called the production possibilities curve.

G.1 When plotted on a graph, the curve simply relates the maximum possible levels of production of capital and consumer goods in all possible proportionate amounts, given that all resources are being efficiently utilized. It becomes clear at once that if society desires more capital goods, it will have to forego production of consumer goods in some proportionate amount, and vice versa.

G.1.a This trade-off is called opportunity cost. That is, the opportunity cost of one good is the amount of the other good that must be given up in order to increase production of the other. More formally, when faced with a decision as to production of goods A and B, increases in production of good A will have associated therewith an opportunity cost, which is measured by the amounts of good B that will be lost in order to increase production of good A.

G.1.b However, we know that the resources used in the production of capital goods and consumer goods are not perfectly interchangeable. Thus, in increasing levels of production of good A, society will be forced to forego ever increasing amounts of good B, per unit of increase of good A. This phenomena is known as the law of increasing cost.

G.2 It should be clear that, given the production possibilities curve for the economy as a whole, that if society is at a level of production located inside the curve, then there is less than complete utilization of all resources present. Unemployment of some resources, human as well as all others, is existent. Society is not efficiently utilizing its resources.

G.3 It should also be clear that society is incapable of producing at a point outside the curve. Given the assumption of fixed resources and technology, this level of production is, by definition, unattainable.

G.4 Is this production possibilities curve a permanent barrier? Of course not.

G.4.a Increases in the stock of available resources will shift the entire curve.

G.4.b Increases in the level of education or technology will also shift the curve.

G.4.c These conditions are the substance of economic growth. Economic growth can be defined then as a rightward shift of the production possibilities curve.

This concludes the second group of concepts you are to learn. Take the appropriate quiz and let's move on to the next unit.

III. The Concept of Capitalism: Production under a Free Enterprise System

Reading Assignments

McConnell	-- pp. 39-53
Issues	--
Getting Started	-- pp. 43-48, 273-279, 109-118, 93-96

A. Capitalism, as an economic system, is structured around several basic tenets. These tenets are responsible for the operation of the American economy.

A.1 The right to private property is one of these tenets. This right gives individuals and businesses the requisite control to move resources around in the production process. The right to private property is maintained over time by the right to bequeath.

A.2 Freedom of enterprise is closely related to the right of private property in that it allows individuals to pursue whatever business they determine to be profitable. Freedom of choice, closely related, allows resource owners to sell their resources wherever there is a market for them.

A.3 Self-interest is one of the most vital forces at work in the capitalistic system. It causes resource suppliers to seek the highest possible prices and consumers to seek the lowest possible prices. Producers, in the middle, thus seek to efficiently utilize their resources in order to maximize profits, thereby keeping order in the economy.

A.4 Competition is a broad term which characterizes the American market structure. It embodies all of the rights and freedoms mentioned above. Competition also prevents concentration of market power. In sum, it is the basic regulatory mechanism of a capitalistic system.

A.4.a Competition exists where the number of buyers and sellers is sufficiently large so that no one buyer or seller acting independently can affect the market.

A.4.b Competition also requires freedom of entry and exit into the market by buyers and sellers.

A.5 The coordinating mechanism in a capitalistic system is a system of markets and prices, which are expressed in some monetary unit.

A.6 Implied in the above mentioned freedoms and rights and in the basics of competition is an absence of government. Competition, through the market and price system, is a self-regulating system and as such does not require the intervention of government in the market place.

B. A modern capitalistic economy, as any modern economy, is characterized by a large presence of capital goods. This observation is not at all surprising. With the large levels of production that are associated with the American economy, we would naturally expect to observe a large capital stock.

C. It is not surprising, moreover, to observe high levels of specialization. Few individuals in the American capitalistic system make all of any one product. Rather, most workers contribute to one phase of the production process.

C.1 This phenomena of breaking the production process down into separate functions is known as the division of labor.

D. Specialization is beneficial between entities, be they states or countries or any markets. By specializing based on its available resources, a market can gain a comparative advantage. That is, a market has an advantage in the production of a particular product because it utilizes less resources than another market in the production of that product.

D.1 The obvious benefit of specialization is more overall efficient utilization of resources. By producing the product in which it has a comparative advantage, society realizes production of that product at a lower resource cost.

E. Specialization, however, brings to mind a question. What if two markets do not desire each other's goods or services? That is, what if there is not coincidence of wants? The solution lies in the use of money.

E.1 It makes no difference what the unit of money is for it to function as a medium of exchange. However, money must pass one test. It must be acceptable to both buyers and sellers in the exchange transaction.

E.2 The use of money in a capitalistic economy can be thought of in terms of a flow, hence the circular flow of money or income principle. If the economy is thought of in terms of a two-sector model (i.e., households as resource owners and business as suppliers of finished goods and services), the principle becomes quite simple. Households exchange resources in return for goods and services. However, it is inconceivable that a worker would be willing to exchange his resource of labor for a pair of shoes day after day. Thus, the role of money is clear. Households exchange their resources for money and then take that

money (called income) and purchase the wanted goods and services (i.e., consumption). This is essentially the same as saying businesses purchase resources and then receive income when their goods and services are sold in the market. The entire process is summed up in the truism: what is consumption to one is income to another, by definition.

F. The circular flow of income model is an economic model and as such is not completely accurate. It has several shortcomings.

F.1 The circular flow model does not include interbusiness transactions. For instance, the sale of finished goods from wholesaler to retailer is omitted.

F.2 Details as to specific operation and the nature of classes of transactions or exchanges are omitted.

F.3 Government intervention in the market is omitted.

F.4 The assumption is made that households do not save. That is, households are assumed to spend their total income.

F.5 If we are really understanding this material, it should also be clear that this model does not address the questions of prices. These considerations will be taken up later.

This concludes our comments concerning production and the free enterprise system for now. Further refinements will come later, after you take the appropriate quiz for this material.

APPENDIX B

SAMPLE OF ACHIEVEMENT QUIZZES

ECONOMICS 2110 TV
SPECIAL PROJECT
Spring Quarter 1976

Cluster II, Form X

Name _____

Soc. Security No. _____

TITLE: The Concept of a System of Production: Transformation of Resources into Goods and Services

_____ 1. A new tuxedo for the Spring dance is a good example of what type of economic want? (1) Collective, (2) Societal, (3) Individual, (4) Temporary.

_____ 2. A low rate of inflation is representative of which of the following types of economic wants? (1) Permanent, (2) Societal, (3) Individual, (4) Cyclic.

_____ 3. The economist knows that resources are limited and that economic wants are unlimited. In so stating these economic facts he is describing (1) an economic theory, (2) the economizing problem, (3) an economic principle, (4) an inflationary economy.

_____ 4. Some resources are provided by nature. In this sense these resources are (1) noneconomic, (2) unlimited, (3) free, (4) nonproductive.

_____ 5. A capital good or resource is one that is (1) not yet completely financed, (2) directly related to production, (3) not available to consumer, (4) subject to depreciation.

_____ 6. Resources which include capital, land, and raw materials are categorized as (1) human resources, (2) free resources, (3) capitalistic resources, (4) property resources.

_____ 7. The factors of production are a classification of (1) cost considerations, (2) production possibilities, (3) managerial skills, (4) economic resources.

_____ 8. The entrepreneur has a very important role in the American economy. That role is (1) resource supplier, (2) price stabilizer, (3) risk bearer, (4) production manager.

_____ 9. Managerial ability is classified by the economist as a (1) property resource, (2) labor resource, (3) capital resource, (4) human resource.

_____ 10. The income that is furnished to the entrepreneur for supplying an economic resource is known as (1) interest, (2) wages, (3) profits, (4) rents.

_____ 11. A trained college professor working as a ditch digger would be treated by the economist as (1) unemployment, (2) underemployment, (3) wasteful employment, (4) gainful employment.

_____ 12. The economist is not only concerned with whether or not a resource is being utilized, but also with whether or not that resource is being utilized to its maximum. This concern is expressed in the concept of (1) the utilization rate, (2) input/output ratio, (3) economic efficiency, (4) human/property resource ratio.

_____ 13. The device which the economist employs to show the relationship of the product of one good to another is the (1) production possibilities curve, (2) opportunity cost curve, (3) production trade-off curve, (4) sacrificed production curve.

_____ 14. "If we increase our production of national defense products, we shall have to decrease our production of consumer goods." This statement typifies the concept of (1) opportunity costs, (2) law of increasing costs, (3) sacrifice costs, (4) non-economic production.

_____ 15. An increase in the general level of technology will (1) shift the production possibilities curve to the left, (2) shift the production possibilities curve to the right, (3) bend the production possibilities curve inward, (4) bend the production possibilities curve in an indeterminate fashion.

ECONOMICS 2110 TV
SPECIAL PROJECT
Spring Quarter 1976

Cluster III, Form X

Name _____

Soc. Security No. _____

TITLE: The Concept of Capitalism: Production Under A Free Enterprise System

_____ 1. To the economist, the importance in the right to private property is that it enables individuals, firms, etc., to (1) compete in any market, (2) enter any form of business, (3) dispose of resources freely, (4) leave any market.

_____ 2. Which of the following elements or principles of capitalism encourages resource suppliers to seek the highest possible prices and resource users to seek the lowest possible prices? (1) right to compete, (2) right of private property, (3) freedom of enterprise, (4) self-interest.

_____ 3. To the economist, competition is said to exist where (1) there is a relatively large number of sellers compared to buyers, (2) there are a relatively large number of both sellers and buyers, (3) government is openly committed to prevention of monopoly, (4) prices present unfair concentration in any one market.

_____ 4. In the definition of competition, the economist says that each seller or buyer is sufficiently small so that he cannot (1) affect the market with his price changes, (2) enter or leave the market, (3) compete unfairly with other buyers or sellers, (4) affect government decisions affecting his market.

_____ 5. One of the freedoms that is enjoyed by buyers and sellers in a competitive economy is freedom (1) from unfair price competition, (2) to enter and leave markets, (3) from high prices in consumer goods market, (4) from high prices in capital goods markets.

_____ 6. The American economy is characterized by a system of markets and prices, which are interlocked to varying extents. The overall purpose of this system is to (1) coordinate the flow of resources and finished goods, (2) eliminate or control market confusion, (3) assist in keeping prices as low as is possible, (4) prevent unfair concentration of market power.

_____ 7. Economists describe pure competition as being characterized by an absence of government intervention in the market. This is true because (1) consumers in a competitive system spend all of their income, (2) resource suppliers always seek the

highest possible prices, (3) resource users always seek the lowest prices, (4) competition is basically a self-regulating system.

_____ 8. In any modern economy we would expect to find (1) low levels of capital goods, (2) high levels of capital goods, (3) no capital goods, (4) government control of capital goods.

_____ 9. If the United States has relatively large deposits of the materials required for the production of steel, then the United States should produce steel and trade for products that it has relatively small amounts of resources required for production. This concept refers to (1) terms of trade, (2) economic efficiency, (3) economic specialization, (4) resource allocation.

_____ 10. If the United States can produce steel for less cost in terms of resources for production, then we can conclude that the United States has (1) a comparative advantage in the production of steel, (2) an edge in trading for consumer goods, (3) a higher cost ratio for producing steel, (4) a lower competitive position for the production of steel.

_____ 11. The United States is desirous of trading steel for rice produced in Japan. This situation described (1) the terms of trade for the two countries, (2) pure competition in the world market, (3) the ratio of resource costs for the two countries, (4) a coincidence of wants between the two countries.

_____ 12. Lack of coincidence of wants is resolved in modern economies by (1) the use of money, (2) direct government intervention, (3) comparative cost advantage, (4) comparative revenue advantage.

_____ 13. As long as money is mutually acceptable to the parties involved in an exchange (1) the parties can trade on a limited basis, (2) the parties can engage in economic specialization, (3) the exchange price will be higher, (4) surpluses will occur in the capital goods market.

_____ 14. We use the circular flow model to show that households buy goods and firms (1) sell resources, (2) buy goods, (3) buy resources, (4) make profits.

_____ 15. On the supply side of the resource market, firms (1) sell resources and households buy resources, (2) buy resources and households sell resources, (3) sell products and households buy resources, (4) buy products and households sell resources.

APPENDIX C

INSTRUCTIONS GIVEN TO THE EXPERIMENTAL GROUPS

INSTRUCTIONS FOR MORNING SUBGROUP
Economics 2110
Special Project
Spring 1976

ADMINISTRATOR: Lee Cates
Room 9-F, Glocker
974-5230

Please read the following instructions. They represent the procedures you will follow for this special project.

1. You have been furnished with a set of concept clusters. The set is composed of five clusters, numbered I through V. At the beginning of each cluster is a reading assignment that corresponds to that cluster. This assignment is to be read and mastered, along with the concept cluster, which is intended to aid your understanding of the assigned material.

2. After you have read and mastered the material in Concept Cluster I and its collaterial text assignments, you are ready to take the first quiz. The quizzes will be given in Room 102-103-104, Undergraduate Library, Monday through Friday, from 10:00 a.m. until 10:50 a.m. The quizzes should not require more than 20 to 25 minutes, so you can come anytime during this hour but allow yourself sufficient time. Your quiz will be scored and a grade assigned according to this scale:

FOR 10-ITEM QUIZZES	Score	Grade
	9-10	A
	7-8	B
	6	C
	5-4	D
	0-3	F

FOR 15-ITEM QUIZZES	Score	Grade
	14-15	A
	12-13	B
	11-9	C
	8-7	D
	0-6	F

FOR 20-ITEM QUIZZES	Score	Grade
	19-20	A
	16-18	B
	12-15	C
	10-11	D
	0-9	F

3. If you do not achieve at least a C on any quiz, you will read the material again and take another quiz of the same length and difficulty, covering the same material.

4. After having taken all five quizzes at least once, you will have five letter grades which will be averaged according to the following scale:

QUIZ LETTER GRADE	POINTS
A	5
B	4
C	3
D	2
F	1

TOTAL POINTS	FINAL GRADE FOR PROJECT
21-25	A
16-20	B
11-15	C
8-10	D
0-7	F

5. This final letter grade for the project will be your first grade for credit in the course. That is, you will have thus earned your Quiz I grade. However, if you wish, you may take the regularly scheduled Quic I on April 21, along with your regular section. If you do, the higher of the two grades will be recorded for your Quiz I grade.

6. Remember, you will be taking a minimum of five quizzes, and a maximum of ten. The reading assignments and quizzes are quite brief; however, you must finish all quizzes prior to April 21. Therefore, you should plan on taking at least TWO quizzes a week.

7. On April 23 you will return to your section for completion of Economics 2110 according to the usual schedule.

FINAL NOTE: You will not return to class prior to April 23.

INSTRUCTIONS FOR AFTERNOON SUBGROUP
Economics 2110
Special Project
Spring 1976

ADMINISTRATOR: Lee Cates
Room 9-F, Glocker
974-5230

Please read the following instructions. They represent the procedures you will follow for this special project.

1. For the period of this project, you will NOT attend class. Furthermore, you will not initially read any material in either the text, the issues book, or in Dr. Spiva's book, or in the study guide.

2. You have been furnished with a set of concept clusters, which are numbered I through V. You will initially ignore the section labeled "Reading Assignment." You will read each concept cluster and then take a quiz designed to measure how well you have learned the material contained therein. Each quiz is to be taken immediately upon completion of the reading. There are five clusters and, therefore, five quizzes. These quizzes may be taken from 2:20 p.m. until 3:30 p.m., Monday through Friday, in Room 102-103-104 of the Undergraduate Library. The quizzes should not require more than 20 to 25 minutes, so you can come anytime during this hour but allow yourself sufficient time. Your quiz will be scored and a grade assigned according to this scale:

FOR 10-ITEM QUIZZES	Score	Grade
	9-10	A
	7-8	B
	6	C
	5-4	D
	0-3	F

FOR 15-ITEM QUIZZES	Score	Grade
	14-15	A
	12-13	B
	11-9	C
	8-7	D
	0-6	F

FOR 20-ITEM QUIZZES	Score	Grade
	19-20	A
	16-18	B
	12-15	C
	10-11	D
	0-9	F

3. You will have taken all five of these quizzes not later than April 9.

4. Should you not achieve at least a C on any of the cluster quizzes, you will read the material in the concept cluster again and this time also read the assignments listed in the "Reading Assignments" section of that cluster. Then you will take the quiz for that cluster again, which will be of the same length and difficulty. To repeat, this applies only to those cluster quizzes for which at least a C was not achieved. If all five quizzes are successfully completed prior to April 9, then you have successfully completed the project. However, please note: All quizzes that are to be retaken will be completed by April 21.

*To reiterate, it is extremely important that you do NOT read anything other than the cluster concepts during this first time through the project.

5. After having taken all five quizzes at least once, you will have five letter grades which will be averaged according to the following scale:

QUIZ LETTER GRADE	POINTS
A	5
B	4
C	3
D	2
F	1

TOTAL POINTS	FINAL GRADE FOR PROJECT
21-25	A
16-20	B
11-15	C
8-10	D
0-7	F

6. This final letter grade for the project will be your first grade for credit in the course. That is, you will have thus earned your Quiz I grade. However, if you wish, you may take the regularly scheduled Quiz I on April 21, along with your regular section. If you do, the higher of the two grades will be recorded for your Quiz I grade.

7. Remember, you will be taking a minimum of five quizzes prior to April 9. Therefore, you should plan on taking a quiz just about every other day. Learn the material well in order to minimize retakes of any of the quizzes.

8. On April 23 you will return to your section for completion of Economics 2110 according to the usual schedule.

SUGGESTION: Merely reading will probably be insufficient to master this material. You are encouraged to find and note key words, to outline the concepts and/or to organize the material in such a way that you can understand it.

APPENDIX D

LETTER TO STUDENTS

The University of Tennessee
Knoxville 37916

March 29, 1976

College of Business Administration

Dear Student

Spring Quarter 1976 will be somewhat different for Economics 2110 this year. I am going to modify the schedule for some of you and would like to offer you an opportunity to participate in a unique experience for about a month (that is, the first one-third of the term).

By signing this letter, you can indicate your desire to participate. If you want to participate, this is what you can expect. You and a small number of students will be furnished special learning aids and some short assignments. You will not attend the televised lectures for the first third of the term. This small group will take several short multiple choice quizzes, but the quizzes will be taken at the times of the regularly scheduled classes. Therefore, no changes to your schedule will be required. This small group will receive special attention and will, I believe, enjoy this program very much.

If you elect to participate in this beneficial program, just sign below and give this letter back to your classroom monitor. You will receive instructions regarding this special group on the second class meeting, Wednesday, March 31.

Sincerely,

/s/ George A. Spiva

George A. Spiva
Associate Professor, Economics

(DETACH HERE AND RETURN TO YOUR MONITOR)

_____ Time of class _____

NAME (last) (first) (middle)

_____ Building and Room # _____

Social Security Number

VITA

Charles Lee Cates was born June 5, 1948, in El Dorado, Arkansas. In 1966 he was graduated from El Dorado High School. In 1970 he was graduated with a Bachelor of Science degree in Economics from The University of Tennessee, Knoxville, Tennessee. In July of 1970 he entered service with the Judge Advocate General's Department of the United States Air Force. In June, 1971, he married Terry Ann Citty in Riverside, California. In May of 1974 he was honorably separated from military service, and he returned to graduate school at The University of Tennessee. He has served The University of Tennessee as a Graduate Teaching Assistant in the Business Administration and Economics Departments since January, 1975. Mr. Cates is a member of the Delta Pi Epsilon and Phi Delta Kappa fraternities.