# THE DIFFERENTIAL IMPACT OF SEVERAL TEACHING STRATEGIES UPON THE INTEGRATION OF ECONOMIC CONCEPTS INTO THE MATHEMATICS CURRICULUM

DISSERTATION

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This investigation focuses upon two major problems. The first problem is to determine what effect the inclusion of economics in the mathematics curriculum will have upon student attitudes toward and understanding and retention of economics and mathematics. The second problem is to determine whether different methods of instruction will result in significantly different levels of student attitudes toward and understanding and retention of economics and mathematics. Each question is divided into two studies dealing with the lecture and field-trip methods and the lecture and games-and-simulations methods. In addition, the investigation seeks to ascertain the degree of interaction of the three teaching strategies with each of the following variables: scholastic aptitude, sex, and socioeconomic status of the students.

The principal sources of data are student responses on a "Personal Data Sheet," test scores on teacher-prepared instruments measuring student understanding of selected economic concepts and ability to perform selected

mathematical skills, and student responses on semantic differentials measuring attitudes toward the disciplines of economics and mathematics.

The organization of the study includes a statement of the problems; a review of the literature; the methodology used in the statistical analysis of the data; an analysis of the data; and the findings, conclusions, speculative inferences, implications, and recommendations for additional research.

Chapter One introduces the background and significance of the problems. Hypotheses to be tested are stated, terms in the study are defined, and limitations are delineated.

Chapter Two is a topically arranged review of the related literature. Literature is included on the analysis of the process and on the student variables related to increased economic understanding; the relationship between economic instruction, increased economic understanding, and other cognitive and affective variables; quasi-experiments relating to the integration of economic concepts into other curricular areas; and quasi-experiments relating to the impact of a variety of teaching strategies upon economic understanding.

Chapter Three includes information on the population of the study, the instrument used for collecting data, the teaching module and classroom procedures, the methods of

data collection, and multiple linear regression, the basic statistical analysis used in the study.

Chapter Four reports the analysis of the data collected in the study. Tables reveal the regression coefficients on the twelve dependent variables used to measure the students' cognitive and affective gains in each of the four studies of this investigation.

Chapter Five concludes that the experimental treatments and the teaching strategies used in this study produce no significantly different mean gains in student cognition and attitudes. Although the experimental treatments and teaching strategies produced no significant main effects upon cognition and attitudes, there are significant interactive effects between the lecture method and the students' socioeconomic status upon the measure of short-term retention of the ability to perform selected mathematical skills, and between the field-trip method and the students' socioeconomic status upon the measure of short-term retention of attitudes toward the discipline of mathematics. The conclusions support the pedagogical implication that the desired increase in economic understanding will not be achieved easily through the integration of economic concepts into the mathematics curriculum. Such an implication should lead concerned curriculum planners and teachers to reevaluate the means used to increase economic understanding among young people.

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# CHAPTER I

## INTRODUCTION

The impact of integrating economic concepts into the mathematics curriculum through microunits of instruction is the focus of this study. It also measures the differential impact of three teaching strategies upon the understanding and retention of certain defined economic concepts and mathematical skills and upon student attitudes toward mathematics and economics. Finally, it determines the interaction of three teaching strategies with each of the following variables: sex, scholastic aptitude, and the socioeconomic status of the students.

The study focuses upon the economic literacy of students. The vital role which economics plays in the lives of students makes such a study important. Because each individual is confronted with the realities of economics as he attempts to harmonize his unlimited wants with his limited resources, an understanding of economics is essential if he is to fulfill his responsibilities as an individual and a citizen in a democratic society.

Despite the importance of economics, few high school students ever enroll in a separate course in the subject. As early as 1961, the Report of the National Task Force on

Economic Education reported that "only about 5 percent of all high school students ever take a separate course in economics" (2, p.156). A 1965 study conducted by the Council for Advancement of Secondary Education reported only slight improvement in this area, noting that 6.1 percent of the total four-year high school enrollment of that year was studying economics in a separate course (9, p. 21). Although there are no current figures available, one might estimate, on the basis of the previous figures, that about 7 percent of all high school students are presently taking a separate course in economics.

In Texas, the lack of economic education is even more pronounced than it is on the national level. Since the 1968-1969 school term, there has been a steady decline in the enrollment of economics courses. (See Table I.) Louis Grigar (Appendix C, p. 235) of the Texas Education Agency has suggested that this decline is due to the increase of other social studies elective courses--i.e., sociology and psychology.

The lack of economic education is reflected in an article written by Roger M. Blough, Chairman of the Board of United States Steel Corporation: "The Opinion Research Corporation asked industrial foremen 39 questions on simple, basic economic concepts. They answered only about half of the questions correctly." Blough, speaking of economics in the secondary schools, stated that "although it seems

TABLE I

STATUS OF ECONOMIC EDUCATION IN TEXAS (1968-1972)

| School Year | Students Enrolled in Economics Courses | Number of Students in Grades 9-12 | Percent of 9-12 Grade Students Enrolled in Economics |
|---|---|---|---|
| 1968-69 | 14,792 | 739,456 | 2.00% |
| 1969-70 | 12,894 | 761,438 | 1.69% |
| 1970-71 | 12,725 | 785,047 | 1.62% |
| 1971-72 | 12,103 | 803,966 | 1.50% |
| 1972-73 | 11,764 | 813,230 | 1.45% |

unfair to burden our secondary schools with the whole responsibility, a start must be made somewhere. The major load must fall upon secondary schools, which educate our youth" (1, p. 35).

On the state level, a study conducted in 1967 among 2,703 senior students in Omaha, Nebraska, reported that the "majority of seniors scored below the median level of economic understanding considered essential for good citizenship" (15, Abstract). The results of this study were supported by the findings of a study conducted in 1969 among 4,547 high school seniors representing 215 high schools in Georgia (14).

Although the level of economic understanding among young Americans must be raised, this cannot be accomplished by placing total reliance upon a separate course which reaches only a small portion of the students. Educators also must seek to increase economic understanding through an integration of economic concepts into other curricular areas as well as through the improvement of the applicable teaching strategies.

## Background and Significance

Until recently, little systematic research was available in the field of economic education. As recently as 1965, for example, the American Economic Association's

Committee on Economic Education received only about thirty responses to an invitation to submit information about experimental techniques in elementary economics together with any evaluations of the effectiveness of these methods. The situation, however, has changed significantly in the last few years. Research articles on economic education have appeared in the American Economic Review, the Western Economic Journal, the Southern Economic Journal, Economics, the Review of Social Economy, the Quarterly Review of Economics and Business, and Social Education. In 1969, the Journal of Economic Education was introduced and has carried numerous articles concerning primary research studies (10).

Most of the studies conducted in the area of economic education have been either the descriptive-survey type or discussions from intuitive evaluations made by instructors looking at their own activities. In other words, most of the studies in the area of economic education have not been of an experimental nature.

Walter E. McPhie (13) compiled a comprehensive guide to doctoral dissertations in social studies education from 1933 to 1962. Of the 556 dissertations in the field, only twenty were in the area of economic education. Richard E. Gross and Leonard de la Cruz (8) conducted a survey of doctoral dissertations in social studies during the period 1963-1969. They noted that there was an actual decline in

the percentage of research of an experimental nature compared with the 1933-1962 period surveyed by McPhie. In a follow-up article to this survey, Gross (7) noted that experimental research studies composed 20 percent of those surveyed by McPhie (1933-1962) but only 10 percent of those surveyed by Gross and de la Cruz (1963-1969).

There is, however, an apparent recent trend toward an increase in social studies dissertations of an experimental nature. June R. Chapin (3) reported to the National Council for the Social Studies that during the period 1969-1973 there was a total of 154 experimental dissertations. This number represents 36 percent of the total number of social studies dissertations completed during that period.

Gerald G. Green (6) wrote abstracts of 125 research reports relative to the teaching of economics prior to 1964. On the basis of these reports, Green concluded that there was a scarcity of research concerning those who have had economic instruction.

This lack of research of an experimental nature, particularly in economic education, was also noted by George Dawson (4) in his 1969 survey of research in economic education. He listed over 900 research projects of which only 133 (or 14 percent) could be classified as generic research.

Much more hard data are needed on many aspects of instructional and curricular performance. Such data are necessary to support or refute theories and to provide objective measurements of the efficacy of programs and approaches for those who wish information concerning the many theories which characterize social studies education and, in particular, economic education.

This study, based on research that is quasi-experimental, finds its significance in the fact that, if the inclusion of economic content into the mathematics curriculum can result in significantly positive gains in economic understanding, mathematical skills, attitudes toward economics and mathematics, and the retention of the same, the information should prove valuable to those who are designing and implementing programs in economic education. These educators would then have statistical evidence upon which to base programs that include economic concepts as a part of the mathematics curriculum.

Further, if significant correlations are found relative to the several teaching strategies and the students' economic understanding, mathematical skills, attitudes toward economics and mathematics, and retention of the same, this should prove valuable to curriculum planners. Curriculum planners would have statistical evidence upon which to base decisions relative to the proper use of different teaching strategies.

## Statement of the Problems

This study focuses upon two major problems. The first problem is to determine what effect the inclusion of economics in the mathematics curriculum will have upon student understanding of, retention of, and attitudes toward economics and mathematics. The second problem is to determine whether different methods of instruction will result in significantly different levels of student understanding of, retention of, and attitudes toward economics and mathematics.

## Purposes of the Study

The purposes of this study are as follows: (1) to ascertain the effect of integrating economic concepts into the teaching of mathematics upon the level of economic and mathematical understanding, the retention of economic and mathematical understanding, student attitudes toward economics and mathematics, and the retention of those attitudes toward economics and mathematics; (2) to ascertain the relative effectiveness of different teaching strategies (lecture-demonstration method, field trips, and games and simulations) upon the level of economic and mathematical understanding, student attitudes toward economics and mathematics, and the retention of those attitudes toward economics and mathematics; and (3) to ascertain the interaction of the

different teaching strategies with each of the following variables--sex, scholastic aptitude, and the socioeconomic status of the students.

## Hypotheses

To carry out the purposes of this study, the following hypotheses have been formulated:

I. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, the teaching strategies $X_1$ and $X_2$ will produce significantly greater mean gains than will teaching strategy $X_c$ ($X_1$ and $X_2$ refer to the experimental groups which received instruction in economic concepts as part of their mathematics course via lecture-demonstration methods and use of field trips, respectively. $X_c$ refers to the control group which received no instruction in economics.) in

   A. Student understanding of selected economic concepts;

   B. Student performance of selected mathematical skills;

   C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

II. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, there will be significantly different mean gains between teaching strategies $X_1$ and $X_2$ in

A. Student understanding of selected economic concepts;

B. Student performance of selected mathematical skills;

C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes towards the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

III. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, the

teaching strategies $X_1$ and $X_3$ will produce significantly greater mean gains than will teaching strategy $X_C$ ($X_1$ and $X_3$ refer to the experimental groups which received instruction in economic concepts as part of their mathematics course via lecture-demonstration method and use of games and simulations method, respectively. $X_C$ refers to the control group which received no instruction in economics.) in

A. Student understanding of selected economic concepts;
B. Student performance of selected mathematical skills;
C. Student short-term retention of the understanding of selected economic concepts;
D. Student short-term retention of the ability to perform selected mathematical skills;
E. Student long-term retention of the understanding of selected economic concepts;
F. Student long-term retention of the ability to perform selected mathematical skills;
G. Student attitudes toward the discipline of economics;
H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics;

IV. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, there will be significantly different mean gains between teaching strategies $X_1$ and $X_3$ in

A. Student understanding of selected economic concepts;

B. Student performance of selected mathematical skills;

C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

## Definition of Terms

The following definitions hold for this study:

1. Construct Validity: The extent to which a test measures one or more dimensions of a theory or trait as determined by panels of experts in economics and mathematics education.

2. Content Validity: The extent to which the content of the test items reflects the academic discipline as determined by panels of experts in economics and mathematics education.

3. Field Trips: A trip arranged by the school and undertaken for educational purposes in which pupils go

to places where the materials of instruction may be observed directly in their functional setting (5, p. 169).

4. Games: Models for student interaction which involve a winner in a competitive setting for the learning of subject matter content. Games contain a chance component with more than one possible outcome (11, p. 2).

5. Lecture-Demonstration: An instructional procedure in which the verbal message is accompanied by the use of an apparatus to illustrate the principles, determine or verify facts, clarify difficult parts, or test for comprehension of the material under discussion without the use of commercially prepared visual aides (5, p. 238).

6. Long-term Retention: A measurement of the aftereffect taken sixty days after the conclusion of the experience.

7. Retention: The result of an experience occurring as a persistent aftereffect that may serve as the basis for future modification of response (5, p. 349).

8. Scholastic Aptitude: The capacity of a person to achieve future success in school as measured by his intelligence quotient score as recorded on his permanent record (5, p. 28).

9. Short-term Retention: A measurement of the aftereffect taken thirty days after the conclusion of the experience.

10. Simulations: Models of a portion of reality in an artificial situation in which students assume roles in a social, economic, or political system and try to understand how the system operates by participating in it as a member, not as an observer. The outcome is defined; there are no chance components (11, p. 2).

11. Socioeconomic Status: The background or environment indicative of both the social and economic status of an individual or group as measured by Hollingshead's Two-Factor Index of Social Position (5, p. 378).

12. Student Attitudes: The positive or negative mental and emotional set of a student with respect to an object or phenomenon as measured by a semantic differential (5, p. 37).

13. Innovative Method: An instructional procedure which includes strategies which differ from the traditional lecture-demonstration method.

## Limitations

The population of this study is limited to those students instructed by participants in the Developmental Economic Education Program (DEEP). This limitation is imposed because of the interest in the effect which DEEP has upon the students' understanding of, retention of, and attitudes toward economics and mathematics.

The study was a quasi-experiment in that the experimental and control groups were not randomly selected and distributed. Differences between groups were controlled by partitioning out those elements which, on an a priori basis, were determined to threaten the internal validity of the study. Multiple regression analysis was used to control the impact of the identified variables. This study is limited to the extent that such analysis is able to insure the internal validity of the study. This limitation was placed upon the study because of the availability of intact groups.

This study is limited by the interactive effects of the selection of the population in the experimental treatments, and the effect of multiple experimental treatments upon the results of student achievement. Such a limitation poses a threat to the external validity of the study and limits its generalizability. This limitation was imposed because of the quasi-experimental nature of the study. The study was designed in this manner because of the advantages of working with intact groups as a first step in obtaining a broader understanding of the differential impact of teaching strategies upon student cognition and attitudes.

The relationships between the various teaching strategies and the levels of understanding of economic concepts

and mathematical skills may be idiosyncratic to the geographic location of the cooperating students. Replication across a broad geographic spectrum is desirable.

## Basic Assumptions

It is assumed that the students will be assigned to the intact groups heterogeneously and that they will respond honestly and to the best of their ability to the instruments used to measure socioeconomic status, academic understanding, and attitudes. It is further assumed that the teachers will accurately follow the predetermined teaching module. Finally, it is assumed that the use of four teachers in three schools will negate the effect of any single instructor or school environment upon either academic achievement or the development of attitudes.

## Summary

Since the 1960's, serious attention has been given to surveying experiments and innovations in economic education, to implementing projects intended to stimulate further research, and to measuring the results (12, p. 25). The problem of this study is to test quasi-experimentally the effect of integrating economics into the mathematics curriculum and the differential impact of three methods of instruction upon student understanding of, retention of, and attitudes toward economics and mathematics.

A three-week unit entitled "Price Index: The Impact of Its Fluctuations on Real Income" was taught using three methods of instruction. Games and simulations, field trips, and traditional lecture-demonstration were assessed as means of increasing student understanding of, retention of, and attitudes toward economics and mathematics.

Student understanding of economic concepts and ability to perform selected mathematical skills were assessed by means of teacher-prepared instruments. Student attitudes toward the disciplines of economics and mathematics were assessed by means of two semantic differentials.

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# CHAPTER II

# REVIEW OF RELATED LITERATURE

The review of the literature is divided into four sections relating to the principal features of the study. The major sections are as follows:

1. Analysis of the process and of the student variables related to increased economic understanding.
2. Relationship between economic instruction, increased economic understanding, and other cognitive and affective variables.
3. Quasi-experiments relating to the integration of economic concepts into other curricular areas.
4. Quasi-experiments relating to the impact of a variety of teaching strategies upon economic understanding.

## Analysis of the Process and of the Student Variables Related to Increased Economic Understanding

It is logical to begin a survey of the related literature by reviewing those efforts designed to identify the process and the student variables which are related to increased economic understanding and which, as a result, need to be controlled in economic education experimentation.

The essence of these studies provides the basis for selection of control variables in current economic education experimentation.

Donald W. Paden and M. Eugene Moyer (18) used multiple regression analysis to determine the significant coefficients in an experiment conducted at the University of Illinois. They found that the significant variables for explaining the variation in scores on the cognitive and affective tests were ability, academic classification, initial level of competence in economics, major, sex, and the number of absences.

Alfred J. Smith, Jr. (22) conducted a study of the relationship between sex, scholastic achievement, learning ability, socioeconomic status, age, major curriculum of concentration, courses taken, and the economic understanding of 1,369 high school seniors in the Mt. Prospect, Illinois, High School District. The results of his study indicated that males were significantly superior in economic understanding to females; he also found that high academic ability, as measured by grade average and intelligence quotient, and socioeconomic status were significantly related to economic cognition. With regard to curricular factors, college preparatory seniors were significantly superior to those who majored in business education, vocational education, or general education.

Bobby Joe Dooley (7) investigated variables related to the posttest scores on a specially constructed economics achievement test among 507 disadvantaged fourth-grade children in eighteen classes. The California Short-Form Test of Mental Maturity was used to measure intelligence, and the Hollingshead Two-Factor Index of Social Position was used to assess the students' social position. Results of Dooley's data analysis, in contrast to the findings of the Paden and Moyer (18) and Smith (22) studies, showed that sex was not a significant predictor of students' economic achievement on posttest scores. Students' socioeconomic status, pretest scores, language ability, teacher education, teacher-attitude rating, and race--Blacks were significantly higher than whites--were significant predictors of posttest scores.

Contrary to the conflicting evidence regarding the influence of sex upon economic understanding, there seem to be no conflicting research studies regarding the influence of student socioeconomic status upon understanding of economic concepts. Sol Spears (24), in a study conducted among 106 first-grade pupils in Culver City, California, and Howard A. Sulkin and Robert W. Prancis (26), in an experiment involving fourth- and fifth-grade students, concluded that pupils from a higher socioeconomic level performed significantly better than those pupils with a

lower socioeconomic status. These studies support the previously reported conclusions of Smith and Dooley.

Additional variables have been identified by Frank W. Gery (10), Wallace D. Oates and Richard E. Quandt (17), and David Ramsett, Jerry Johnson and Curtis Adams (19). Gery found that the students' mathematics background was positively related to increased economic understanding. (This contradicts the Paden and Moyer study cited above.) Oates and Quandt concluded that graduate teaching assistants did about as well as regular faculty members in the instruction of undergraduate economics courses. Ramsett et. al found that "good" teachers, as determined by student evaluation, had a favorable effect upon students' attitudes toward the discipline of economics.

The research evidence has provided significant assistance in identifying control variables for quasi-experimental studies. There is, however, a broad range of student and instructor main effect and interactive variables which still need to be investigated if one is to be definitive in identifying those factors significantly related to economic understanding.

## Relationship Between Economic Instruction, Increased Economic Understanding, and Other Cognitive and Affective Variables

The need for increased economic understanding and the impact of economic instruction upon the students' cognitive understanding of selected economic concepts and upon attitudes toward the discipline of economics are the focal points of this study. Resent research in economic education has provided insight into these issues.

As early as 1963, a study was conducted in California among 3,908 senior students in nineteen randomly selected high schools. This study concluded that seniors with economic instruction proved superior to those without economic instruction in the forty-three-item Survey of Economic Understanding (6). Similar studies were conducted in Nebraska in 1967 (23), Illinois in 1967 (22), Maryland in 1968 (12), Indiana in 1969 (9), and Mississippi in 1969 (8). All of these studies have supported the conclusion that high school students who have had instruction in economics have a significantly better understanding of economics than those students who have not had instruction in economics.

Elementary school students also have shown increased understanding of economics as a result of participation in economics programs. Howard A. Sulkin and Robert W. Pranis (26) reported on two programs involving twelve fourth-grade

classes and twelve fifth-grade classes. Six classes from each group participated in the six-week economics program, while six were control classes. The results of the study indicated that the students who participated in the programs had significantly higher posttest scores than students who did not participate in the programs.

These results are supported by studies conducted by Sol Spears (24) among first-grade pupils in Culver City, California and by Mary Witt (30) among fourth- and fifth-grade students at the Memphis State University campus school. It is apparent that economics instruction will increase economic understanding of students at the elementary and secondary school levels.

In 1967, a study was conducted in New York to determine whether students who had had economics courses in high school made greater progress in college economics courses than those who had had no previous training in economics. The SRA Test of Economic Understanding (TEU) was administered as a pretest and posttest to 638 students in four New York colleges and universities. The students who had had previous experience in economics courses scored higher on both the pretest and posttest. However, the college economics course did eliminate some of the initial differences between the groups. In other words, the group which

had had an economics course in high school knew more about economics after the college course because they knew more about economics before the college course (5).

The effects of economics instruction upon the retention of economic understanding among elementary school pupils has not been clearly established. The Sulkin and Pranis study (26) found that the fourth-grade experimental group scored significantly higher than the control group on a test taken a year after the completion of the economics program; however, there was no significant difference in retention among the fifth-graders. A follow-up study, published by Sulkin (25) indicated that exposure to the fourth-grade program had little influence on learning the fifth-grade program.

It is evident that instruction in economics does significantly improve the economic understanding of elementary and secondary students. Researchers are, however, also interested in determining the effects of economics instruction upon the affective domain. This is much more difficult to measure; therefore, there is considerably less research material available on that topic.

Thus far, research efforts have not developed a clear link between increased economic understanding and a change in attitude among students. Research activities are only

beginning to measure the degree to which instruction in economics affects an attitudinal change in students.

One such study, conducted by Edward G. Sewell (21), attempted to determine the effect of an increased understanding of economics upon the attitudes of secondary school pupils. A specially prepared, multiple-choice Test of Understanding of Economic Principles was administered to 922 students in twenty-seven classes in eleven schools in eight states. Fifteen classes of 518 students took the test after class instruction in economics, and twelve classes of 404 students took the test without prior classwork in economics. The results indicated that there was a significant difference between the mean scores of the groups with and without work in economics.

An instrument of twenty statements, which was developed for an attitude scale, was presented to the high school students who responded in terms of agreement or disagreement. The instrument produced a scale ranging from one to five, with five indicating the most conservative score and one the most liberal score. The 404 students who marked the attitude scale before work in economics had a mean score of 3.42. The 518 who marked the scale after work in economics made a mean score of 3.50. This difference was significant beyond the .01 level.

Those students marking the attitude scale before and after classwork in economics were tested for changes in attitudes. The change in mean score toward a more conservative attitude after taking economics was significant at the .01 level. Of the students tested only once, those with work in economics showed a lower conservative attitude than those without, at the .01 level (21).

Darrell Lewis and Tor Dahl (13) have researched the relationship between critical-thinking skills and student performance in the principles of economics course. The results of their study, conducted among 784 University of Minnesota students enrolled in Economics I (Principles of Economics--Macroeconomics) in twenty-three experimental and control sections, indicate that the teaching of the principles of economics does contribute significantly to the development of critical-thinking skills. They further found that, when critical-thinking skills are explicitly taught in an experimental context, little difference in performance can be observed between experimental and control groups.

Another study was undertaken in 1969 as part of a doctoral dissertation at the State University of New York, Albany. Students in forty-six New York State public high schools were pretested and posttested with instruments which measured changes in both the affective and cognitive

domains. The resulting scale measured the extent to which the students' attitudes toward economic problems were similar to the attitudes of the experts in the field of economics. The findings of this research showed that, as knowledge and understanding of economics increased, the students' attitudes toward the economic problems of society tended to agree with the concensus of the economists. Thus, it was shown that instruction in economics did have an impact upon the attitudes of the high school students (11).

William A. Luker (14) of the Center for Economic Education at North Texas State University has undertaken considerable research concerning the effect which instruction in economics has upon the affective domain. In a study conducted in 1970 among students at NTSU, he concluded that 1) there was no relationship between knowledge of economics and dogmatism; 2) there was no relationship between knowledge of economics and opinionation; and 3) there was no positive relationship between economic knowledge and conservatism.

In the spring semester of 1972, Luker and Steve W. Wood conducted a similar study among the 696 senior students in Amarillo, Texas. On the basis of this study, they concluded that

> decreased dogmatism is associated with increased economic understanding. Furthermore, this relationship persists when academic ability, student evaluation of the course, socioeconomic class and pretest understanding of economics are held constant (15, p. 7).

They further concluded that

> the change in economic understanding was not related to a change in liberalism-conservatism. In other words, although increased economic understanding was related to decreased dogmatism, the students' basic liberalism or conservatism was not altered. This, of course, is important in developing economic education programs that are objective and nonpropagandistic (15, p. 8).

The effect which economic education has upon the affective domain has not been adequately determined. The studies which have been conducted are only a beginning and require extensive replication if the affective results of economic education are to be determined.

## Quasi-Experiments Relating to the Integration of Economic Concepts into Other Curricular Areas

Numerous efforts have been made since 1962, largely through the Kazangian Foundation, to integrate economic concepts into other curricular areas. Most of these activities have not been of an experimental nature. Instead, they have been descriptive reports of the classroom activities of enterprising teachers. Two significant efforts of a quasi-experimental nature are reported in this section.

In 1967, Marvin A. Clark (4) conducted a study intended to determine whether it is possible to teach economic concepts concurrently and incidentally with the normal teaching of typewriting skills. Ninth-grade students from

seventeen classes in nine Minneapolis, Minnesota, junior high schools were assigned to one of two experimental groups. One group of students typed timed writings from specially prepared copy containing economic information. The other group of students used timed writings from specially prepared copy taken from typewriting textbooks.

An economics achievement test was given as a pretest and posttest for the purpose of determining whether equal gains in economic achievement occurred in both experimental groups as a result of typing the special materials. The group using economics copy material scored significantly higher, at the .01 level, than the group using textbook materials on the economics posttest. This group also made a significantly higher gain at the .01 level from the pretest to the posttest. It was concluded that the use of economics copy material contributed to the learning of economic concepts at all ability levels. Analysis of covariance also indicated that the use of typewriting copy containing economic concepts contributed to increased economic understanding without adversely affecting typewriting speed or accuracy.

Marianne Bonds and William A. Luker (3) reported on a project which integrated economic concepts into the English curriculum through the study of Animal Farm by George Orwell. A one-week unit was taught to two senior English classes in

one of the high schools in Midland, Texas. One of the classes was supplemented with readings and discussions concerning comparative economic systems. The other class served as the control group and studied Animal Farm in the traditional manner.

Both groups were pre- and posttested using twenty questions from the Test of Economic Understanding. On the basis of regression analysis, they concluded that the students in the experimental course, when controlled for differences in pretest knowledge, ability, and absence, scored significantly higher on the posttest of economic understanding.

The integration of economic concepts into the instruction of other curricular areas seems to be effective in increasing the economic understanding of the students. At the same time, such instruction has not had adverse effect upon the students' progress in the curricular areas under study.

Quasi-Experiments Relating to the Impact of a Variety of Teaching Strategies on Economic Understanding

The study of the effects of various teaching strategies on cognition in the instruction of economics is of recent origin. The use of objective questions in the evaluation of the success of pedagogy in economics had its genesis in 1960 (27). The great push in this area began during the

summer of 1969 when the staff of the Joint Council of Economic Education met with the Directors of Centers for Economic Education from all sections of the United States to develop a series of research projects to be conducted during the following academic year (28). This was one of the first organized attempts by any of the social science disciplines to become involved with pedagogy on the basis of rigorous research.

Hard research in economic education has been concentrated in six basic areas: 1) traditional lectures, 2) games and simulations, 3) textbook differentials, 4) computer-assisted instruction, 5) television, and 6) programmed learning. Although educational literature has abundant research studies covering a wider range of teaching strategies, research in economic education has been limited to the categories listed above. This study is concerned with the traditional lecture-demonstration method, field trips, and games and simulations. This section will, therefore, concern itself with a review of the literature concerning the use of the traditional lecture-demonstration method and games and simulations in economic education.

Richard L. Wing (29) reported on the development and evaluation of three experimental computer-based economics games for the sixth grade. During the course of this project,

three computer-based games were developed: The Sumerian Game, The Sierra Leone Game, and The Free Enterprise Game. The first two games were used in a formal experiment.

In 1965-66, twenty-six sixth-grade students from Yorktown Heights, New York, played the two newly developed computer-based economics games. Meanwhile, a control class of equal scholastic aptitude studied the same economics topics and content under the direction of a talented teacher using only "conventional" methods.

Employing statistical tests for significance, the researchers reported the following conclusions: 1) the computer-based economics games were at least as effective in teaching principles of economics as the classroom method with which they were compared; 2) the control group showed greater retention of economic understanding several months after the instruction than did the experimental group; and 3) the game appears to have been superior in teaching interpretation of graphs and diagrams but not as effective in teaching facts.

Charles R. Anderson (1) conducted a study to determine whether a simulation learning game was more effective than traditional classroom activities in teaching consumer credit to senior high school students. Three teachers taught a portion of their twelfth-grade Problems of Democracy

classes through a simulation game and the other portion by the traditional lecture-demonstration approach.

A Knowledge Test Score and two measures of observable behavior (a Comparison Frequency Score and a Contract Rating Score) were the basis for comparing the effectiveness of the two teaching strategies. The study concluded that the simulation learning game was equally as effective as traditional classroom activities in teaching students about consumer credit.

Terry K. Reigel (20) reported on a study which examined whether students completing a simulation-game series in economics would score higher in cognitive skills than those taught by the traditional lecture-demonstration method. The study also investigated whether there is a significant increase in critical-thinking ability by students using a simulation game in economics compared to those taught by the lecture-demonstration method.

Eight twelfth-grade classes, taught by four instructors, were selected from a New Jersey high school during the 1968-69 school year. The four control classes were taught by the lecture-discussion method, while the four experimental classes were taught basically with Economic Discussion Games.

Two tests were administered during three phases of the experiment: the Watson-Glaser Critical Thinking Appraisal, Form YM, and Stages of Economic Growth. Analysis of

covariance was run for the pretest, posttest, and retention test scores on both tests. Both groups gained significantly in cognitive skills as a result of the study. There were no significant differences between the groups.

Glenn F. Marston, Kenneth Lyon and Richard Knight (16) conducted two experiments to determine the effectiveness of a national income simulation model with respect to student understanding of economic concepts and interest in the discipline of economics. One experiment was conducted among university students and the other among high school students.

In both experiments students were assigned to control and experimental groups. The experimental groups played the National Income Simulation Game, while the control group received the conventional method of instruction. Using regression analysis, the authors concluded that the differences in achievement between the control and experimental groups were not significant in either experiment.

Data regarding the students' interest in economics were collected by asking students about their interest in economics compared with other subjects they had taken in the last two years. In both experiments there was no evidence that the National Income Simulation Game increased interest in economics. The authors, therefore, concluded that the National Income Simulation Game was neither superior nor

inferior to the conventional method of instruction in regard to the development of an understanding of macroeconomics and an interest in economics.

Marianne Bonds (2) attempted to determine the differential impact of four pedagogical delivery systems on student understanding of elementary economic concepts. She measured the differential impact of a programmed text, a simulation game, closed-circuit television, and lecture-and-discussion methods upon the students' economic understanding and attitudes toward the discipline of economics.

The experiment was conducted among 113 students enrolled in a weekly lecture section of Economics 110 (Microeconomic Theory) during the fall semester of 1972 and the spring semester of 1973 at North Texas State University. The four informational delivery systems were used during regularly scheduled laboratory sessions conducted by tutors (graduate students in the Economics Department).

Multiple regression analysis was used to analyze the data obtained from the students' test scores on the Test of Understanding in College Economics, the students' revealed preferences for specific methodologies, and the students' evaluations of specific methodologies considered most effective in preparation for class examinations.

On the basis of the research, the author concluded that there was no significant differential impact

attributable to the four methodologies on the students' understanding of economic concepts. She further found that the students had a statistically significant preference for games and simulations and lecture and discussion over closed-circuit television and programmed learning.

To date, no experimental research has been conducted regarding the impact of field trips upon students' understanding of economics and attitudes toward economics. Several descriptive studies have included field trips as part of the methodological treatment; however, there is no hard research upon which to base a judgment regarding their impact upon the students' cognition or attitudes.

On the basis of research evidence, one can conclude that games and simulations used alone or with other instructional methods do as well as the traditional lecture-demonstration method of instruction in increasing student understanding of economic concepts and in improving student attitudes toward economics. Such information can provide the instructor with confidence in using the innovative method, which may assist in the achievement of other desirable objectives, without fearing a loss of cognitive and affective gains.

There is, however, no research evidence comparing the differential impact of the traditional lecture-demonstration

method and field trips upon economic understanding. One might infer that, since there were no significantly different results between the other methods of instruction, there would also be no significantly different results between these methods. As a result of the difference in learning experiences, the cautious researcher must await the results of such experiments before concluding that there are no significant differences between the methodologies.

## Summary

The review of the literature in economic education provides rather clear directions for the researcher. As a result of the efforts of the American Economic Association and the Joint Council on Economic Education, there has been a major increase of interest in experimentation in the teaching of economics since the 1960s. This interest has led to a variety of experiments and projects to encourage further experimentation. The findings of these experiments provide a pattern which gives direction for further research.

The research analyzing the process and the student variables related to increased economic understanding has identified a set of control variables for quasi-experimental studies in economic education. This set includes the students' scholastic aptitude, sex, socioeconomic status, grade level,

age, initial level of competence in economics, major curricular area of concentration, number of absences from class, and teacher differences.

The literature provides abundant evidence that economics instruction has a positive effect upon the students' understanding of economics. The impact of economics instruction upon student attitudes is not as clearly understood. The available research evidence does indicate that there is a relationship between economics and affective variables. The direction and extent of that relationship is in need of further clarification.

Most of the activities related to the integration of economics into other curricular areas have not been of an experimental or quasi-experimental nature. The available research evidence indicates that, when economics is integrated into other curricular areas, the students' understanding of economics increases without an adverse effect upon their understanding of the concepts and skills of the other discipline.

There has been considerable research indicating that there is no significant differential impact between games and simulations and the traditional lecture-demonstration method upon student understanding of economics and attitudes toward economics. There has, however, been no

research comparing the differential impact of field trips and traditional lecture-demonstration methods upon student understanding of economics and attitudes toward economics.

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# CHAPTER III

# METHODOLOGY

## Population Frame

The population for this study consisted of all students enrolled in twelve selected mathematics classes taught by four junior high school teachers in the Dallas Independent School District during the spring semester of 1973-74. There were 272 students who participated in the study.

To insure that the subjects' responses did not differ in any systematic manner from other samples, four outside control groups were used. These four control groups were selected at random from the mathematics classes taught in the same junior high schools in which the experimental groups resided. There were 104 students who participated in the outside control groups.

## Characteristics of Teachers

The selected mathematics teachers were participants in an institute in economic education during the summer of 1973 at North Texas State University in Denton, Texas. As a part of this institute, a teaching module, which was used for the integration of economic concepts into the mathematics curriculum, was constructed.

Table II describes the characteristics of the teachers in the experimental and outside control groups. There were three females and one male teacher working with the experimental groups. Three of the experimental teachers were Negro, and one was Caucasian. The average age of the experimental teachers was 28.5 years. Their average teaching experience was 7.25 years. All of the experimental teachers had mathematics as their first teaching field. Two of the experimental teachers had eighteen hours of credit in economics, and two teachers had twenty-four hours of credit in economics. The average undergraduate grade point average of the experimental teachers was 3.3 on a 4.0 basis.

There were two female and two male teachers in the outside control groups. Two of these teachers were Caucasian, and two were Negro. The outside control teachers had an average age of 33.25 years. The average teaching experience of these teachers was 9.75 years. Mathematics was the first teaching field of all of the outside control teachers; however, only one had any credits in the discipline of economics. The teachers of the outside control groups had an undergraduate grade point average of 3.2 on a 4.0 basis.

## Teaching Module

The teaching module was a three-week unit entitled "Price Index: The Impact of Its Fluctuations on Real Income."

TABLE II

CHARACTERISTICS OF EXPERIMENTAL AND OUTSIDE CONTROL TEACHERS

| Teacher | Group | Sex | Race | Age | Teaching Experience | Teaching Field | Credits in Economics | Undergraduate G.P.A. |
|---|---|---|---|---|---|---|---|---|
| $T_1$ | Exp. | F | N | 32 | 10 | Math. | 18 | 3.0 |
| $T_2$ | Exp. | M | N | 29 | 7 | Math. | 24 | 3.2 |
| $T_3$ | Exp. | F | C | 25 | 5 | Math. | 18 | 3.6 |
| $T_4$ | Exp. | F | N | 28 | 7 | Math. | 24 | 3.5 |
| $T_5$ | Con. | F | N | 29 | 8 | Math. | 0 | 3.0 |
| $T_6$ | Con. | M | N | 27 | 4 | Math. | 0 | 2.8 |
| $T_7$ | Con. | F | C | 32 | 4 | Math. | 0 | 3.4 |
| $T_8$ | Con. | M | C | 45 | 23 | Math. | 30 | 3.6 |

It was the objective of this module to enable the students

1. to define "price index" in their own words;
2. to identify the Consumer Price Index as the main device for measuring changes in general price-level trends of consumer goods and services;
3. to identify the Bureau of Labor Statistics as the main agency for compiling the Consumer Price Index;
4. to construct a two-axis graph of price index versus time, given the price index for the respective years;
5. to construct a three-item index, given base period data and current data;
6. to calculate the percentage of change in the Consumer Price Index with respect to the base period; and
7. to determine whether real income increased or decreased, given fluctuations in the Consumer Price Index and an income that remained constant.

The lecture-discussion method developed these abilities through classroom lectures, demonstrations, and the use of numerous student worksheets and handouts. The field-trip method used all of the activities of the lecture-demonstration

method. In addition, it included a field trip to a grocery store and another trip to the school's cafeteria.

The games-and-simulations method centered its activities around several economic games and simulations. Included in the materials were "The Market" (Science Research Associates) and "Consumer" (Western Publishing Company, Inc.), in addition to parts of the material included in the lecture-demonstration method.

The control groups received instruction in their regular areas of study. This instruction was not supplemented with economic concepts relating these mathematical operations to an understanding of the price index or its fluctuations.

## Classroom Procedures

The twelve intact groups, taught by the four teachers who attended the economics institute, were divided into eight experimental groups and four control groups. The experimental groups received instruction in economic concepts as outlined in the teaching module. (See Appendix B.) The control groups received their regular instruction in mathematics.

Four outside control groups were taught by teachers who had not attended the economics institutes. They received no instruction in economic concepts. They also received their regular instruction in mathematics.

Demographic information was obtained on all of the students in the population and control groups. This information included their sex, scholastic aptitude, and socioeconomic status.

Each intact group was divided randomly into two groups of equal size. Section 1 of each intact group was pretested on economic concepts and mathematical skills, using the teacher-prepared instrument. They were also pretested with a semantic differential to measure their attitudes toward economics and mathematics.

The experimental groups were paired with respect to the methodology employed by the instructor. The methodologies used were lecture-demonstration, field trips, and games and simulations. Each teacher taught one section via the lecture-demonstration method and one section using one of the other methodologies, as indicated in the research design.

Upon the completion of the teaching module, sections 1 and 2 of each intact group were posttested on economic concepts, mathematical skills, and attitudes toward economics and mathematics, using a companion instrument to the pretest.

Retention tests measuring the students' understanding of economic concepts, mathematical skills, and attitudes toward economics and mathematics were administered thirty

and sixty days after the completion of the posttest. These retention tests were administered to the entire population of students with companion instruments to the pretest and posttest.

Figure 1 presents this procedure in the format of a flow chart.

## Instruments

The students' attitudes toward the disciplines of mathematics and economics were measured by a semantic differential. The semantic differential is a technique for measuring the meaning of a concept. The respondent is asked to rate that concept in terms of a set of bipolar adjectives. He is asked to indicate the direction and intensity of his perception of each concept on the seven-point continuum (6).

The bipolar adjectives, which were factor analyzed by C. E. Osgood (6) in 1957, resulted in three factors called evaluation, potency, and activity. The scales representing the same factor are alternated in polarity direction to prevent the formation of position preferences. The differential technique can be analyzed through analysis of variance and is particularly appropriate for factor analysis, since the data are perceived as interval data.

Item, factor-score, and concept-meaning reliabilities have coefficients of .85. Test-retest coefficients in the

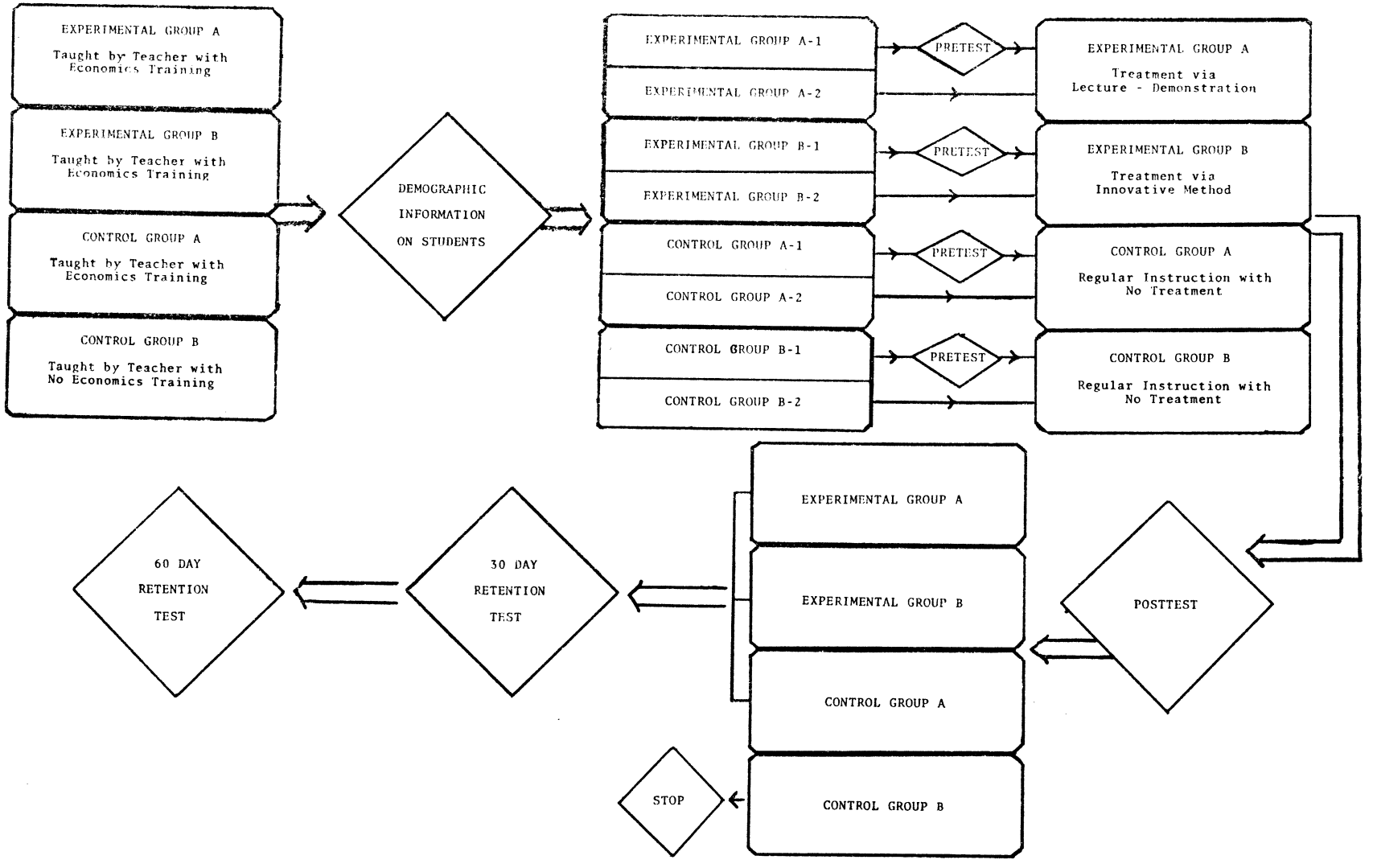


Fig. 1--Flow chart depicting classroom procedures

measurement of attitudes range from .87 and .93, depending upon the adjectives used, with a mean r (computed by z-transformation) of .91.

The validity of the semantic differential as a measurement of attitude is high. Osgood(6) reported on a comparison of the semantic differential with the Thurstone scales. He found that the correlation between the two measurements was significantly greater than chance (.01 level). The validity coefficients ranged from .74 to .82; but, when corrected for attenuation, each is raised to the order of .90 or better. It was apparent that whatever the Thurstone scales measured was measured just about as well by the semantic differential.

A further comparison was made with a fourteen-item Guttman-type scale. The rank-order correlation between the two instruments was likewise greater than chance (.01 level). It is again evident that the semantic differential measures the same thing as the Guttman scale (6, pp. 125-195).

The Two-Factor Index of Social Position was used to determine the students' socioeconomic status. This Index is a modification of the Three-Factor Index of Social Position used by August B. Hollingshead in the study of Social Class and Mental Illness published in 1958 (4). The Index utilizes occupation and education as factors determining the hierarchy of socioeconomic status. These factors are scaled and weighted individually, and a single score is obtained

from the sum, with a high score indicating a low socio-economic status and a low score indicating a high socio-economic status. (See Appendix C.)

The occupational scale is a modification of the Alba Edwards system of classifying occupations into the socio-economic groups used by the United States Bureau of the Census. The scale used in the Index ranks professions into different groups and businesses by their size and value. Its effective use is dependent on the precise knowledge of the occupation of the head of the household.

The educational scale is premised upon the assumption that people who possess similar educations will tend to have similar tastes and similar attitudes, and that they will tend to exhibit similar behavioral patterns. It is based upon the years of school completed by the head of the household.

The Index score is calculated by multiplying the factor weight by the scale scores of each factor and adding the products. The occupational position has a factor weight of seven, and educational position has a factor weight of four.

The various combinations of scale scores for occupations and education are reproducible, for there is no overlap between education-occupation combinations. If an individual's education and occupations are known, one can

calculate his score. Conversely, if one knows an individual's score, he can calculate both occupational position and educational level (1, p. 385).

Hollingshead and others have made extensive studies of the reliability of scoring and the validity of the Index on over one hundred variables. The previously cited 1958 study by Hollingshead found that the prediction of social class using education and occupation as variables had a .906 correlation with the prediction of social class using a 200-question schedule and interviewer impressions. In another survey of the New Haven, Connecticut, community, Theodore Anderson found that 78.2 percent of the households were placed in the same class, using Hollingshead's Index and an extensive survey based on the household's use of mass media of communication (4, pp. 387-407). On the basis of this extensive use of the Two-Factor Index of Social Position, it was deemed to be a reliable, valid, and convenient method of estimating the socioeconomic status of students for this study.

The instruments used for pretest, posttest, and retention measurements of economic understanding and mathematical skills were teacher-prepared tests. The validity of these instruments was determined on an a priori basis by two panels of three judges selected upon the advice of the advisory committee. The validity of the instruments was

verified by obtaining the coefficient of correlation between the individual test items and the final score of the test. The reliability of these instruments was determined through the use of the Kuder-Richardson formula-20 test of internal consistency.

The validation panel for the economics test was composed of the following members:

Lewis Abernathy, Associate Professor of Economics and Director of Manpower Institute, North Texas State University,

Robert Carter, Curriculum Coordinator, Midland Independent School District, and

Thomas Holland, Executive Director of Texas Council for Economic Education.

The validation panel for the mathematical skills test was composed of the following members:

William Denton, Program Evaluator, Dallas Independent School District,

Pamela Hamilton, Director of Title III Project, Dallas Independent School District, and

B. G. Nunley, Associate Professor of Mathematics, North Texas State University.

The validation panels were asked to determine both content and construct validity of the tests. This was deemed feasible based upon observations made by Robert Thorndike and Elizabeth Hagen:

> In practice, establishing the content and the construct validity of a test are often closely interwoven. Thus, the same steering committee that judges the importance of different items of content may undertake to translate the underlying concepts . . . into manageable aspects of behavior for testing. The two types of judgments may be made at the same time and by the same people (7, p. 114).

The members of the panels were provided with a list of the module's objectives and a description of the teaching module to aid their evaluation of the instrument. On the basis of their observations, test items were amended and added to the instrument before its use.

The instruments were administered to eighty-one pupils in grades seven through nine in the Denton Independent School District prior to the inaugeration of the study. The validity of the instruments was verified by obtaining a Pearson product-moment correlation coefficient of each test item and the total scores of the Denton group and the two Dallas experimental pretest groups. Tables III and IV present the correlation coefficients of the tests of mathematical skills and economic concepts.

Those items that produced a negative coefficient in the Denton group were reworded upon the advice of the validation panel and used in their new form. All except one of the items had a positive coefficient in the pretest results. That item was retained because of its insignificantly small

TABLE III

CORRELATION COEFFICIENTS OF TEST-ITEMS AND TOTAL SCORES OF MATHEMATICS TEST

| Test Item | Denton Group | Dallas Group |
|---|---|---|
| 1 | 0.1807 | 0.1274 |
| 2 | 0.1719 | 0.4216 |
| 3 | 0.1863 | 0.3333 |
| 4 | 0.4593 | 0.1397 |
| 5 | 0.3370 | 0.3795 |
| 6 | 0.3550 | 0.5484 |
| 7 | 0.3787 | 0.3776 |
| 8 | 0.2634 | 0.3579 |
| 9 | 0.4132 | 0.3857 |
| 10 | 0.2274 | 0.3690 |
| 11 | 0.4096 | 0.4323 |
| 12 | 0.2370 | 0.4845 |
| 13 | - 0.1130 | 0.3799 |
| 14 | 0.4442 | 0.2501 |
| 15 | 0.5239 | 0.3000 |
| 16 | 0.3420 | 0.4237 |
| 17 | 0.5150 | 0.4786 |
| 18 | 0.3653 | 0.5114 |
| 19 | - 0.1285 | 0.5502 |
| 20 | 0.3605 | 0.1424 |
| 21 | 0.2535 | 0.2863 |
| 22 | 0.2051 | 0.0944 |
| 23 | 0.2388 | 0.0823 |
| 24 | 0.1611 | 0.1324 |
| 25 | 0.1661 | 0.2133 |
| 26 | 0.1235 | 0.2647 |
| 27 | 0.2442 | 0.1274 |
| 28 | - 0.0007 | - 0.0472 |
| 29 | 0.4062 | 0.2950 |
| 30 | 0.0177 | 0.0289 |
| 31 | 0.1411 | 0.0967 |
| 32 | 0.4627 | 0.2578 |
| 33 | 0.3759 | 0.1747 |
| 34 | 0.4593 | 0.3720 |
| 35 | 0.3362 | 0.5089 |
| 36 | 0.4995 | 0.3431 |
| 37 | 0.5071 | 0.5449 |
| 38 | 0.4267 | 0.3426 |
| 39 | 0.4255 | 0.4056 |
| 40 | 0.4792 | 0.5711 |
| 41 | 0.5051 | 0.4626 |
| 42 | 0.4628 | 0.3150 |

negative coefficient. On the basis of these results, the instrument was confirmed as a valid measurement of the students' mathematical skills.

TABLE IV

CORRELATION COEFFICIENTS OF TEST-ITEMS AND TOTAL SCORES OF ECONOMICS TEST

| Test Item | Denton Group | Dallas Group |
|---|---|---|
| 1 | 0.5449 | 0.4253 |
| 2 | 0.3996 | 0.2438 |
| 3 | 0.1970 | 0.2870 |
| 4 | 0.5609 | 0.3818 |
| 5 | 0.5283 | 0.3509 |
| 6 | 0.4882 | 0.1866 |
| 7 | - 0.0260 | 0.1660 |
| 8 | 0.2508 | 0.4781 |
| 9 | 0.3934 | 0.4252 |
| 10 | 0.2306 | 0.5746 |
| 11 | 0.4013 | 0.4616 |
| 12 | 0.3716 | 0.2491 |
| 13 | 0.3465 | 0.2352 |
| 14 | 0.2617 | 0.3058 |
| 15 | 0.2437 | 0.2093 |
| 16 | 0.3213 | 0.4538 |
| 17 | 0.4823 | 0.3566 |

The item that produced a negative coefficient in the Denton group was reworded upon the advice of the validation panel and used in its new form. All items had a positive coefficient in the pretest results. On the basis of these results, the instrument was confirmed as a valid measurement of the students' understanding of selected economic concepts.

The reliability of the instruments was estimated on the basis of their administration to the eighty-one pupils

in grades seven through nine in the Denton Independent School District. Verification of the estimated reliability was obtained on the basis of the pretest scores of the students in the two experimental groups. Both estimates were obtained through the use of the Kuder-Richardson formula-20 test of internal consistency.

The Kuder-Richardson reliability coefficient is based upon the premise that, if a test is reliable, every item should measure the same general factors of ability and should correlate positively with one another. The ideal measure of reliability in most instances is obtained from the correlation of alternate forms of a test; however, measures of reliability based on internal consistency provide useful estimates of the test reliability. Measures based on internal consistency do not take into account measurement errors that occur because of changes in people over time; hence, measures based on internal consistency provide upper limits to the results usually obtained from alternate forms. The Kuder-Richardson formula-20 is used to estimate the correlation between an existing test and a hypothetical alternate form when alternate forms are not available. Since alternate forms of the teacher-prepared tests were not available, the reliability of these instruments was estimated by using this measure of internal consistency (5, pp. 536-537).

Table V presents the reliability coefficients of the test of mathematical skills and the test of economic concepts.

TABLE V

RELIABILITY COEFFICIENTS OF COGNITIVE INSTRUMENTS

| Group | Test | N | KR 20 |
|---|---|---|---|
| Denton | Mathematics | 81 | 0.7575 |
| Dallas | Mathematics | 96 | 0.7901 |
| Denton | Economics | 81 | 0.4872 |
| Dallas | Economics | 96 | 0.5285 |

The reliability coefficients of the economics scores are low because students are responding to questions whose content is new to them. All of the reliability coefficients were statistically significant at the .01 level. The instruments were therefore considered to be reliable measures of the students' understanding of mathematical skills and selected economic concepts.

## Variables

The variables used in this research appear in Tables VI and VII which follow.

TABLE VI

VARIABLES USED TO TEST COGNITION IN MATHEMATICS AND ECONOMICS

| Variable | Description | Continuous or Dichotomous | Reference |
|---|---|---|---|
| Y - Cognitive test of mathematical skills and economic concepts | A measure of the change in ability to perform mathematical skills and to understand selected economic concepts. | C | Teacher-prepared tests |
| $X_1$ - Experimental treatments | A series of variables used to codify each group and account for individual group differences. | D | . . . . . |
| $X_2$ - Teaching strategy | A series of variables used to codify each teaching strategy and account for methodological differences. | D | . . . . . |
| $X_3$ - Instructors | A series of variables used to codify each instructor and account for individual instructor differences. | D | . . . . . |
| $X_4$ - Student sex | A dichotomized variable where 1 = male and 2 = female. | D | School records |

TABLE VI--Continued

| Variable | Description | Continuous or Dichotomous | Reference |
|---|---|---|---|
| $X_5$ - Scholastic aptitude | The capacity of a person to achieve future success in school as measured by his IQ score. | C | School records |
| $X_6$ - Scholastic aptitude-Missing data points | A dichotomized variable where 1 = data available and 0 = data not available. | D | . . . . . |
| $X_7$ Student socio-economic status | The social and economic background of the student as measured by the Hollingshead Two-Factor Index of Social Position. | C | Student questionnaire |
| $X_8$ - Initial cognitive level in mathematics and economics | A measure of pre-experimental ability to perform mathematical skills and to understand selected economic concepts. | C | Teacher-prepared test |
| $X_9$ - Initial cognitive level-Missing data points | A dichotomized variable where 1 = data available and 0 = data not available. | D | . . . . . |

TABLE VI--Continued

| Variable | Description | Continuous or Dichotomous | Reference |
|---|---|---|---|
| $X_{10}$ - Interaction of students' aptitude and teaching strategies | A series of variables obtained by multiplying the students' IQ score by the dichotomized variable used to identify the teaching strategies. | C | . . . . . |
| $X_{11}$ - Interaction of students' sex and teaching strategies | A series of variables obtained by multiplying the dichotomized variable used to identify the students' sex by the dichotomized variable used to identify the teaching strategies. | C | . . . . . |
| $X_{12}$ - Interaction of students' socioeconomic status and teaching strategies | A series of variables obtained by multiplying the students' scores on the Index of Social Position by the dichotomized variable used to identify the teaching strategies. | C | . . . . . |

TABLE VII

VARIABLES USED TO TEST ATTITUDES TOWARD MATHEMATICS AND ECONOMICS

| Variable | Description | Continuous or Dichotomous | Reference |
|---|---|---|---|
| Y - Affective test of attitudes toward mathematics and economics | A measure of the change in attitudes toward the disciplines of mathematics and economics. | C | Teacher-prepared semantic differential |
| $X_1$ - Experimental treatments | A series of variables used to codify each group and account for individual group differences. | D | . . . . . |
| $X_2$ - Teaching strategy | A series of variables used to codify each teaching strategy and account for methodological differences. | D | . . . . . |
| $X_3$ - Instructors | A series of variables used to codify each instructor and account for individual instructor differences. | D | . . . . . |
| $X_4$ - Student sex | A dichotomized variable where 1 = male and 2 = female. | D | School records |

TABLE VII--Continued

| Variable | Description | Continuous or Dichotomous | Reference |
|---|---|---|---|
| $X_5$ - Scholastic aptitude | The capacity of a person to achieve future success in school as measured by his IQ score. | C | School records |
| $X_6$ - Scholastic aptitude-Missing data points | A dichotomized variable where 1 = data available and 0 = data not available. | D | . . . . . |
| $X_7$ - Student socio-economic status | The social and economic background of the student as measured by the Hollingshead Two-Factor Index of Social Position. | C | Student questionnaire |
| $X_8$ - Initial attitudes toward mathematics and economics | A measure of the pre-experimental attitudes toward the disciplines of mathematics and economics. | C | Teacher-prepared semantic differential |
| $X_9$ - Initial attitudes toward mathematics and economics | A dichotomized variable where 1 = data available and 0 = data not available. | D | . . . . . |

TABLE VII--Continued

| Variable | Description | Continuous or Dichotomous | Reference |
|---|---|---|---|
| $X_{10}$ - Interaction of students' aptitude and teaching strategies | A series of variables obtained by multiplying the students' IQ score by the dichotomized variable used to identify the teaching strategies. | C | . . . . . |
| $X_{11}$ - Interaction of students' sex and teaching strategies | A series of variables obtained by multiplying the dichotomized variable used to identify the students' sex by the dichotomized variable used to identify the teaching strategies. | C | . . . . . |
| $X_{12}$ - Interaction of students' socioeconomic status and teaching strategies | A series of variables obtained by multiplying the students' score on the Index of Social Position by the dichotomized variable used to identify the teaching strategies. | C | . . . . . |

## Analytical Methodology

### Research Design

The basic research design is a modification of Campbell and Stanley's quasi-experimental, nonequivalent control-group design number 10 and the quasi-experimental, separate-sample pretest-posttest control-group design number 13 (2, pp. 47-55) and is schematically outlined as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| | R | $O_1$ | $X_1$ | $O_2$ | $O_3$ | $O_4$ |
| | R | | $X_1$ | $O_5$ | $O_6$ | $O_7$ |
| | | | | | | |
| $T_1$ | R | $O_8$ | $X_2$ | $O_9$ | $O_{10}$ | $O_{11}$ |
| and | R | | $X_2$ | $O_{12}$ | $O_{13}$ | $O_{14}$ |
| $T_2$ | | | | | | |
| | R | $O_{15}$ | | $O_{16}$ | $O_{17}$ | $O_{18}$ |
| | R | | | $O_{19}$ | $O_{20}$ | $O_{21}$ |

Fig. 2--Research design for experimental teachers one and two.

| | | | | | |
|---|---|---|---|---|---|
| | R | $O_1$ | $X_1$ | $O_2$ | $O_3$ $O_4$ |
| | R | | $X_1$ | $O_5$ | $O_6$ $O_7$ |
| $T_3$ and $T_4$ | R | $O_8$ | $X_3$ | $O_9$ | $O_{10}$ $O_{11}$ |
| | R | | $X_3$ | $O_{12}$ | $O_{13}$ $O_{14}$ |
| | R | $O_{15}$ | | $O_{16}$ | $O_{17}$ $O_{18}$ |
| | R | | | $O_{19}$ | $O_{20}$ $O_{21}$ |

Fig. 3--Research design for experimental teachers three and four.

| | | | |
|---|---|---|---|
| $T_{OC}$ | R | $O_1$ | $O_2$ |
| | R | | $O_5$ |

Fig. 4--Research design for outside control teachers.

O = Pretest, posttest, and retention scores on mathematical skills and economic understanding and attitudes toward mathematics and economics,

$T_1$, $T_2$, $T_3$ and $T_4$ = Experimental teachers,

$T_{OC}$ = Outside control teachers,

$X_1$ = Lecture-demonstration method,

$X_2$ = Field-trip method, and

$X_3$ = Games-and-simulation method.

## Statistical Procedures

Data were subjected to multiple linear-regression analysis, with the regression statistics revealing how each variable affected the cognitive and affective scores, other things remaining constant. The basic statistical design of the multiple linear regression was of the form $Y = a + b_1x_1 + b_2x_2 \ldots + b_nx_n$. The dependent variable Y was assumed to be additively and linearly related to the predictor variables. The Y, or dependent variable, in the multiple linear-regression analyses was the posttest and retention scores of the mathematical skills and economic understanding and the posttest and retention scores of the attitudes toward the disciplines of mathematics and economics.

The independent variables which were used were the following:

$X_1$ = Experimental treatments,

$X_2$ = Teaching strategies,

$X_3$ = Instructor differences,

$X_4$ = Sex of students,

$X_5$ = Scholastic aptitude of students,

$X_6$ = Socioeconomic status of students, and

$X_7$ = Initial cognitive and affective level of students.

The critical statistics were the beta coefficients of the $X_1$ and $X_2$ variables. Other variables were utilized for control purposes.

These analyses permitted the inclusion of continuous quantitative variables and also the inclusion of dichotomous qualitative variables in the dummy form (3, p. 428). Missing data points were controlled by substituting the category's mean score for the missing data and including a dummy companion variable where 1 = real data and 0 = mean substitution.

To test Hypothesis One, the regression of the dependent variable (cognitive and affective posttest and retention scores for each subject) on one particular independent variable (experimental treatments) was measured, while the values of other independent variables were held constant. The critical statistic was the beta coefficient of the $X_1$ variable. Other variables were utilized for control purposes. (See Tables VIII-XIX.)

To test Hypothesis Two, the regression of the dependent variable (cognitive and affective posttest and retention scores for each subject) on one particular independent variable (teaching strategies) was measured, while the values of other independent variables were held constant. The critical statistic was the beta coefficient of the $X_2$ variable. Other variables were utilized for control purposes. (See Tables VIII-XIX.)

To test Hypothesis Three, the regression of the dependent variable (cognitive and affective posttest and retention scores for each subject) on one particular independent variable (experimental treatments) was measured, while the values of other independent variables were held constant. The critical statistic was the beta coefficient of the $X_1$ variable. Other variables were utilized for control purposes. (See Tables XX-XXXI.)

To test Hypothesis Four, the regression of the dependent variable (cognitive and affective posttest and retention scores for each subject) on one particular independent variable (teaching strategies) was measured, while the values of other independent variables were held constant. The critical statistic was the beta coefficient of the $X_2$ variable. Other variables were utilized for control purposes. (See Tables XX-XXXI.)

Additional multiple linear-regression analyses were run to measure the regression of the dependent variable (cognitive and affective posttest and retention scores for each subject) on the independent variables which were obtained from the interaction of the teaching strategies (lecture-demonstration method and field-trip method) and the control variables (sex, scholastic aptitude, and socio-economic status), while the values of other independent variables were held constant. The critical statistics were

the beta coefficients of the $X_2 \cdot X_4$, $X_2 \cdot X_5$, and $X_2 \cdot X_6$ variables. Other variables were utilized for control purposes. (See Tables VIII-XIX.)

Additional multiple linear-regression analyses were run to measure the regression of the dependent variable (cognitive and affective posttest and retention scores for each subject) on the independent variables which were obtained from the interaction of the teaching strategies (lecture-demonstration method and games-and-simulations method) and the control variables (sex, scholastic aptitude and socioeconomic status), while the values of other independent variables were held constant. The critical statistics were the beta coefficients of the $X_2 \cdot X_4$, $X_2 \cdot X_5$, and $X_2 \cdot X_6$ variables. Other variables were utilized for control purposes. (See Tables XX-XXXI.)

All collected data were keypunched for electronic data processing. The research hypotheses are stated in the null form for testing.

I. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, the teaching strategies $X_1$ and $X_2$ will produce no significantly greater mean gains than will teaching strategy $X_C$ in

A. Student understanding of selected economic concepts;

B. Student performance of selected mathematical skills;

C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

II. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, there will be no significantly different mean gains between teaching strategies $X_1$ and $X_2$ in

A. Student understanding of selected economic concepts;

B. Student performance of selected mathematical skills;

C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

III. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, the teaching strategies $X_1$ and $X_3$ will produce no significantly greater mean gains than will teaching strategy $X_C$ in

A. Student understanding of selected economic concepts;

B. Student performance of selected mathematical skills;

C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

IV. Other things being equal, when the effects of the control variables (sex, scholastic aptitude, and socioeconomic status) are partitioned out, there will be no significantly different mean gains between teaching strategies $X_1$ and $X_3$ in

A. Student understanding of selected economic concepts;

B. Student performance of selected mathematical skills;

C. Student short-term retention of the understanding of selected economic concepts;

D. Student short-term retention of the ability to perform selected mathematical skills;

E. Student long-term retention of the understanding of selected economic concepts;

F. Student long-term retention of the ability to perform selected mathematical skills;

G. Student attitudes toward the discipline of economics;

H. Student attitudes toward the discipline of mathematics;

I. Student short-term retention of attitudes toward the discipline of economics;

J. Student short-term retention of attitudes toward the discipline of mathematics;

K. Student long-term retention of attitudes toward the discipline of economics; and

L. Student long-term retention of attitudes toward the discipline of mathematics.

Levels of significance are reported.

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# CHAPTER IV

## ANALYSIS OF DATA

In order to test the hypotheses of this research, four studies, each requiring twelve multiple linear regressions to analyze the various aspects of each hypothesis, were conducted. The analysis of data follows the organization of these studies and corresponds to the previously stated hypotheses.

### Study I

Study I was an analysis of the differential impact of the experimental treatments (lecture and field trip) versus the control treatment upon the students' understanding and retention of selected economic and mathematical concepts and upon the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. The data were subjected to twelve multiple linear-regression analyses in order to test the various aspects of Hypothesis One.

Table VIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-A. The hypothesized difference between the

experimental treatments and the control treatment on the students' understanding of selected economic concepts was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table IX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-B. The hypothesized difference between the experimental treatments and the control treatment on the students' ability to perform selected mathematical skills was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table X provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-C. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of selected economic concepts was not significant for the lecture or field-trip methods. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for

Study I-D. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of the ability to perform selected mathematical skills was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-E. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of the understanding of selected economic concepts was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-F. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of the ability to perform selected mathematical skills was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XIV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-G. The hypothesized difference between the experimental treatments and the control treatment on the students' attitudes toward the discipline of economics was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-H. The hypothesized difference between the experimental treatments and the control treatment on the students' attitudes toward the discipline of mathematics was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XVI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-I. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of attitudes toward the discipline of economics was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XVII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-J. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of attitudes toward the discipline of mathematics was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method. The hypothesized difference between the experimental treatment (lecture) and the control treatment of the students' short-term retention of attitudes toward the discipline of mathematics approached the level of significance (0.0542). There was a significant interaction between the students' socioeconomic status and the field trip versus control variables.

Table XVIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study I-K. The hypothesized difference between the experimental treatments and the control treatment of the students' long-term retention of attitudes toward the discipline of economics was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

Table XIX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the

multiple linear-regression analysis of the variables for Study I-L. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of attitudes toward the discipline of mathematics was not significant. Neither the lecture nor the field-trip methods produced significantly higher mean gains than did the control method.

## Study II

Study II was an analysis of the differential impact of the lecture method versus the field-trip method upon the students' understanding and retention of selected economic and mathematical concepts and upon the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. The data were subjected to twelve multiple linear-regression analyses in order to test the various aspects of Hypothesis Two.

Table VIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-A. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-A. The hypothesized difference between the lecture and field-trip methods upon the students' understanding of selected economic concepts was not

significant. The field trip did not produce mean gains which were significantly different from those achieved by the lecture method.

Table IX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-B. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-B. The hypothesized difference between the lecture and field-trip methods upon the students' ability in mathematical skills was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table X provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-C. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-C. The hypothesized difference between the lecture and field-trip methods upon the students' short-term retention of understanding of selected economic concepts was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-D. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-D. The hypothesized difference between the lecture and field-trip methods upon the students' short-term retention of ability in mathematical skills was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-E. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-E. The hypothesized difference between the lecture and field-trip methods upon the students' long-term understanding of selected economic concepts was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study

II-F. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-F. The hypothesized difference between the lecture and field-trip methods upon the students' long-term retention of ability in mathematical skills was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XIV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-G. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-G. The hypothesized difference between the lecture and field-trip methods upon the students' attitudes toward the discipline of economics was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-H. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-H. The hypothesized difference

between the lecture and field-trip methods upon the students' attitudes toward the discipline of mathematics was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XVI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-I. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-I. The hypothesized difference between the lecture and field-trip methods upon the students' short-term retention of attitudes toward the discipline of economics was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XVII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-J. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-J. The hypothesized difference between the lecture and field-trip methods upon the students' short-term retention of attitudes toward the discipline of

mathematics was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XVIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-K. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-K. The hypothesized difference between the lecture and field-trip methods upon the students' long-term retention of attitudes toward the discipline of economics was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XIX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study II-L. The data reflect the significance of the difference between the adjusted means of the lecture method and field-trip method for Study II-L. The hypothesized difference between the lecture and field-trip methods upon the students' long-term retention of attitudes toward the discipline of

mathematics was not significant. The field-trip method did not produce mean gains which were significantly different from those achieved by the lecture method.

## Study III

Study III was an analysis of the differential impact of the experimental treatments (lecture and games and simulations) versus the control treatment upon the students' understanding and retention of selected economic and mathematical concepts and upon the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. The data were subjected to twelve multiple linear-regression analyses to test the various aspects of Hypothesis Three.

Table XX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-A. The hypothesized difference between the experimental treatments and the control treatment on the students' understanding of selected economic concepts was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study

III-B. The hypothesized difference between the experimental treatments and the control treatment on the students' ability to perform selected mathematical skills was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-C. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of selected economic concepts was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-D. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of the ability to perform selected mathematical skills was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

There was a significant interaction between the students' socioeconomic status and the lecture versus control variables.

Table XXIV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-E. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of selected economic concepts was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-F. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of ability in mathematical skills was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXVI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-G. The hypothesized difference between the experimental treatments and the control treatment on the students'

attitudes toward the discipline of economics was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXVII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-H. The hypothesized difference between the experimental treatments and the control treatment on the students' attitude toward the discipline of mathematics was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXVIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-I. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of attitudes toward the discipline of economics was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXIX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study

III-J. The hypothesized difference between the experimental treatments and the control treatment on the students' short-term retention of attitudes toward the discipline of mathematics was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

Table XXX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-K. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of attitudes toward the discipline of economics was not significant. Neither the lecture nor the games-and-simulations methods produced higher mean gains than did the control method.

Table XXXI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study III-L. The hypothesized difference between the experimental treatments and the control treatment on the students' long-term retention of attitudes toward the discipline of mathematics was not significant. Neither the lecture nor the games-and-simulations methods produced significantly higher mean gains than did the control method.

## Study IV

Study IV was an analysis of the differential impact of the lecture method versus the games-and-simulations method upon the students' understanding and retention of selected economic and mathematical concepts and upon the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. The data were subjected to twelve multiple linear-regression analyses to test the various aspects of Hypothesis Four.

Table XX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-A. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-A. The hypothesized difference between the lecture and games-and-simulations methods upon the students' understanding of selected economic concepts was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-B. The data reflect the significance of the difference between the adjusted means of the lecture method and the

games-and-simulations method for Study IV-B. The hypothesized difference between the lecture and the games-and-simulations method upon the students' ability in mathematical skills was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-C. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-C. The hypothesized difference between the lecture and the games-and simulations methods upon the students' short-term retention of understanding of selected economic concepts was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-D. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-D. The hypothesized difference between the lecture and the

games-and-simulations methods upon the students' short-term retention of ability in mathematical skills was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXIV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-E. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-E. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' long-term understanding of selected economic concepts was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXV provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-F. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-F. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' long-term retention

of ability in mathematical skills was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXVI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-G. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-G. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' attitudes toward the discipline of economics was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXVII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-H. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-H. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' attitudes toward the discipline of mathematics was not significant. The

games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXVIII provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-I. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-I. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' short-term retention of attitudes toward the discipline of economics was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXIX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-J. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-J. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' short-term retention of attitudes toward the discipline of mathematics

was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXX provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-K. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-K. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' long-term retention of attitudes toward the discipline of economics was not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

Table XXXI provides a breakdown of the partial standard and partial absolute beta coefficients produced by the multiple linear-regression analysis of the variables for Study IV-L. The data reflect the significance of the difference between the adjusted means of the lecture method and the games-and-simulations method for Study IV-L. The hypothesized difference between the lecture and the games-and-simulations methods upon the students' long-term retention of attitudes toward the discipline of mathematics was

not significant. The games-and-simulations method did not produce mean gains which were significantly different from those achieved by the lecture method.

# CHAPTER V

# FINDINGS, CONCLUSIONS, SPECULATIVE INFERENCES, IMPLICATIONS, AND RECOMMENDATIONS

## Findings

### Findings Related to Hypotheses

The preceding analysis of data provides the basis for the findings of this study. The findings are reported in relation to the four hypotheses of the study.

Hypothesis One stated that, other things being equal, when the effect of the control variables are apportioned, the teaching strategies $X_1$ and $X_2$ will produce no mean gains which are significantly different from those achieved by teaching strategy $X_c$ in the students' understanding and retention of selected economic and mathematical concepts and in the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. Hypothesis One is accepted. (See Tables VIII-XIX.)

Hypothesis Two stated that, other things being equal, when the effects of the control variables are apportioned, there will be no significantly different mean gains between teaching strategies $X_1$ and $X_2$ in the students' understanding and retention of selected economic and mathematical concepts

and in the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. Hypothesis Two is accepted. (See Tables VIII-XIX.)

Hypothesis Three stated that, other things being equal, when the effects of the control variables are apportioned, the teaching strategies $X_1$ and $X_3$ will produce no mean gains which are significantly different from those achieved by teaching strategy $X_C$ in the students' understanding and retention of selected economic and mathematical concepts and in the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. Hypothesis Three is accepted. (See Tables XX-XXXI.)

Hypothesis Four stated that, other things being equal, when the effects of the control variables are apportioned, there will be no significantly different mean gains between teaching strategies $X_1$ and $X_3$ in the students' understanding and retention of selected economic and mathematical concepts and in the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. Hypothesis Four is accepted. (See Tables XX-XXXI.)

## Additional Findings

In the testing of Hypothesis One, the interactive effect of the teaching strategies and control variables upon the criterion variables was also tested. The test results show that a significant interactive relationship exists between

the field-trip method and the students' socioeconomic status in relation to the students' short-term retention of positive attitudes toward the discipline of mathematics. (See Table XVIII.)

In the testing of Hypothesis Three, the interactive effect of the teaching strategies and control variables upon the criterion variables was also tested. The test results show that a significant interactive relationship exists between the lecture method and the students' socioeconomic status in relation to the students' short-term retention of ability to perform selected mathematical skills. (See Table XXIII.)

## Conclusions

The findings of this study suggest the following conclusions.

First, there was no significant differential impact attributable to the experimental treatments (lecture and field-trip methods) upon the students' understanding and retention of selected economic and mathematical concepts and the students' development and retention of positive attitudes towards the disciplines of economics and mathematics. (See Study I.)

Second, there was no significant differential impact attributable to the teaching strategies (lecture and field-trip methods) upon the students' understanding and retention

of selected economic and mathematical concepts and the students' development and retention of positive attitudes toward the disciplines of economics and mathematics. (See Study II.)

Third, there was no significant differential impact attributable to the experimental treatments (lecture and games-and-simulations methods) upon the students' understanding and retention of selected economic concepts and the students' development and retention of positive attitudes toward the discipline of economics and mathematics. (See Study III.)

Fourth, there was no significant differential impact attributable to the teaching strategies (lecture and games-and-simulations methods) upon the students' understanding and retention of selected economic concepts and the students' development and retention of positive attitudes toward the discipline of economics and mathematics. (See Study IV.)

Additional findings suggest the following conclusions which are based upon the findings not hypothesized.

First, even though the experimental treatments showed no significant impact on cognition, there was a significant interactive effect with an experimental treatment (lecture) and control variable (socioeconomic status) upon cognition. Students with a low socioeconomic status had greater mean gains on the measure of short-term retention of ability to

perform selected mathematical skills than those students with a high socioeconomic status in the experimental-lecture group. Students with a high socioeconomic status had greater mean gains on the measure of short-term retention of ability to perform selected mathematical skills than those students with a low socioeconomic status in the control group. (See Table XXIII.)

Second, even though the experimental treatments showed no significant impact on the affective domain, there was a significant interactive effect with an experimental treatment (field trip) and a control variable (socioeconomic status) upon student attitudes toward the discipline of mathematics. Students with a high socioeconomic status had greater mean gains on the measure of short-term retention of attitudes toward the discipline of mathematics than students with a low socioeconomic status in the experimental-lecture group. Students with a low socioeconomic status had greater mean gains on the measure of short-term retention of attitudes toward the discipline of mathematics than students with a high socioeconomic status in the control group.

## Speculative Inferences

The following inferences are based upon the two significant interactions which were found through the analysis of the data. No clear trend of cause-and-effect relationship

can be found based upon such limited findings. One must, therefore, be cautious about placing unwarranted importance upon the conclusions. The curious researcher is, however, inclined to speculate on the causes of the observed interactive effects. Such speculative inferences may provide the basis upon which further research can be implemented.

The conclusions indicate that the experimental lecture method had a significantly greater impact among students with a low socioeconomic status than among students with a high socioeconomic status. This impact was evidenced in the short-term retention of the ability to perform selected mathematical skills. On the basis of this, one might infer that students with a low socioeconomic status are influenced more positively by the more highly structured format of the lecture-demonstration method because of their greater reliance upon the classroom teacher and classroom activites for their education.

Secondly, it was observed that the experimental field-trip method achieved significantly greater mean gains among students with a high socioeconomic status in the short-term retention of positive attitudes toward the discipline of mathematics than among students with a low socioeconomic status. The conclusion would seem to support the earlier inference regarding the lower reliance upon classroom activities by those students with a high socioeconomic status.

It seems that such students would be more favorably impressed by out-of-classroom activities and thus would develop a more positive attitude toward the discipline associated with such activities than would students with a low socioeconomic status.

## Implications

The conclusions of this study provide the basis for several pedagogical implications. These implications may provide direction for the concerned curriculum planner and teacher.

The Joint Council on Economic Education has repeatedly sought to "build economics into existing school curricula at all grade levels" (2, p. 12). Through its efforts, teachers have been trained and units of instruction written in order to include economic concepts in the regular instructional program in a wide variety of curricular areas. It has been assumed that such an integration of economic concepts into other curricular areas would provide a relatively easy and effective means of increasing the economic understanding of young people.

The teaching module used in this study provided an excellent opportunity for the integration of economic concepts into the mathematics curriculum. In addition, the teachers of the experimental groups were well-trained in the discipline of economics. According to the assumption of the

Joint Council on Economic Education, the students instructed in the experimental groups should have achieved significant gains in economic understanding.

The conclusions of this study imply that the desired increase in economic understanding will not be achieved easily through the integration of economic concepts into the mathematics curriculum. This calls into question the assumptions of the Joint Council on Economic Education. Such an implication should lead concerned curriculum planners and teachers to re-evaluate the means used to increase economic understanding among young people.

## Recommendations

It is suggested that further research using a true experimental design or the Latin square, a modification of the quasi-experimental, counter-balanced design No. 11 (1, pp. 50-52), be implemented. Such a study would provide additional protection against the threats to internal and external validity present in this study.

Finally, it is suggested that this study be replicated across a broad range of subject areas and different student groups.

## CHAPTER BIBLIOGRAPHY

1. Campbell, Donald T. and Julian C. Stanley, Experimental and Quasi-Experimental Designs for Research. Chicago, Rand McNally and Company, 1966.

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# APPENDIX A

## EXPLANATORY NOTE FOR TABLES VIII-XXXI

F is the ratio of explained to unexplained variations.

P is the probability of a chance relationship.

TABLE VIII

REGRESSION COEFFICIENTS OF STUDENT UNDERSTANDING OF SELECTED ECONOMIC CONCEPTS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | 0.21221191 | 0.00140529 | 0.0009 | 2.5280 | 0.1168 |
| Lecture method | 0.19404413 | 0.78355368 | 4.6275 | 0.0287 | 0.8661 |
| Field-trip method | - 0.27183489 | - 1.09767414 | 3.5006 | 0.0983 | 0.7549 |
| Student sex | 0.06589842 | 0.43595129 | 0.5852 | 0.5549 | 0.4591 |
| Student IQ | 0.19207486 | 0.05471984 | 0.0340 | 2.5854 | 0.1128 |
| Student IQ--MDP | 0.08286728 | 1.00445600 | 1.2988 | 0.5981 | 0.4422 |
| Socioeconomic status | - 0.16159663 | - 0.03976593 | 0.0223 | 3.1687 | 0.0799 |
| Economics pretest | 0.18904982 | 0.31406846 | 0.1798 | 3.0517 | 0.0855 |
| Pretest--MDP | 0.65777133 | 4.42263511 | 2.6083 | 2.8750 | 0.0949 |
| Mathematics pretest | - 0.01425676 | - 0.00990582 | 0.1096 | 0.0082 | 0.9283 |
| Pretest--MDP | - 0.43468217 | - 2.93721877 | 2.6873 | 1.1946 | 0.2785 |
| Attitudes to economics pretest | 0.10817285 | 0.03571631 | 0.0307 | 1.3535 | 0.2490 |

TABLE VIII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Attitudes to mathematics pretest | 0.11757836 | 0.04374548 | 0.0438 | 0.9981 | 0.3216 |
| Pretest--MDP | - 0.07682984 | - 0.76219952 | 1.0528 | 0.5241 | 0.4718 |
| Interaction of IQ and lecture | - 0.19931907 | - 0.01011248 | 0.0465 | 0.0472 | 0.8286 |
| Interaction of IQ and field trips | 0.41161042 | 0.02039888 | 0.0532 | 0.3362 | 0.5641 |
| Interaction of sex and lecture | - 0.18033133 | - 0.47585846 | 0.8628 | 0.3042 | 0.5832 |
| Interaction of sex and field trips | 0.17463891 | 0.46587177 | 0.8928 | 0.2723 | 0.6036 |
| Interaction of socio-economic status and lecture | 0.22012290 | 0.01635414 | 0.0277 | 0.3487 | 0.5570 |
| Interaction of socio-economic status and field trips | - 0.14365024 | - 0.01070494 | 0.0298 | 0.1291 | 0.7206 |

*Constant = - 1.62072981

TABLE IX

REGRESSION COEFFICIENTS OF STUDENT ABILITY IN SELECTED MATHEMATICAL SKILLS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | 0.47234624 | 0.00675865 | 0.0017 | 16.2973 | 0.0001 |
| Lecture method | - 0.47778011 | - 4.16867539 | 9.6302 | 0.1874 | 0.6666 |
| Field-trip method | 0.42826515 | 3.73665280 | 7.2848 | 6.2631 | 0.6098 |
| Student sex | - 0.11529051 | - 1.64800405 | 1.2071 | 1.8641 | 0.1770 |
| Student IQ | 0.24793737 | 0.15262233 | 0.0697 | 4.7880 | 0.0324 |
| Student IQ--MDP | 0.10511870 | 2.75314827 | 2.6970 | 1.0421 | 0.3112 |
| Socioeconomic status | 0.17229462 | 0.09161199 | 0.0463 | 3.9172 | 0.0522 |
| Mathematics pretest | 0.46189647 | 0.69345165 | 0.2111 | 10.7919 | 0.0017 |
| Pretest--MDP | 0.54845135 | 8.00763657 | 5.5617 | 2.0730 | 0.1549 |
| Economics pretest | 0.10577834 | 0.37970521 | 0.3806 | 0.9954 | 0.3223 |
| Pretest--MDP | - 0.10075646 | - 1.46379699 | 5.5546 | 0.0694 | 0.7930 |
| Attitudes to mathematics pretest | - 0.16659217 | - 0.13392517 | 0.0904 | 2.1949 | 0.1434 |

TABLE IX--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | 0.07279822 | 1.56049086 | 2.1941 | 0.5058 | 0.4796 |
| Attitudes to economic pretest | 0.00068620 | 0.00048956 | 0.0647 | 0.0001 | 0.9940 |
| Interaction of IQ and lecture | 0.69763578 | 0.07648230 | 0.0965 | 0.6281 | 0.4310 |
| Interaction of IQ and field trips | - 0.56922916 | - 0.06095493 | 0.0731 | 0.6953 | 0.4075 |
| Interaction of sex and lecture | 0.08637690 | 0.49249974 | 1.8010 | 0.0748 | 0.7854 |
| Interaction of sex and field trips | 0.09519696 | 0.54871932 | 1.8631 | 0.0867 | 0.7693 |
| Interaction of socio-economic status and lecture | - 0.35277838 | - 0.05663257 | 0.0574 | 0.9724 | 0.3278 |
| Interaction of socio-economic status and field trips | - 0.00385120 | - 0.00062012 | 0.0621 | 0.0001 | 0.9921 |

*Constant = -25.35875506

TABLE X

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT UNDERSTANDING OF SELECTED ECONOMIC CONCEPTS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.17329813 | - 0.00088923 | 0.0008 | 1.1335 | 0.2913 |
| Lecture method | 2.03576099 | 6.36966568 | 4.2806 | 2.2143 | 0.1420 |
| Field-trip method | - 0.77868088 | - 2.43640433 | 3.3473 | 0.5298 | 0.4693 |
| Student sex | - 0.05430944 | - 0.27839399 | 0.5696 | 0.2389 | 0.6268 |
| Student IQ | 0.04570542 | 0.01008936 | 0.0322 | 0.0984 | 0.7548 |
| Student IQ--MDP | 0.00916828 | 0.08611078 | 1.2175 | 0.0050 | 0.9439 |
| Socioeconomic status | - 0.07701346 | - 0.01468477 | 0.0213 | 0.4767 | 0.4926 |
| Economics pretest | - 0.04926369 | - 0.06341567 | 0.1730 | 0.1343 | 0.7153 |
| Pretest--MDP | - 0.08262750 | - 0.43047942 | 2.4838 | 0.0300 | 0.8630 |
| Mathematics pretest | 0.01644728 | 0.00885493 | 0.1028 | 0.0074 | 0.9316 |
| Pretest--MDP | 0.12610084 | 0.66824337 | 2.5554 | 0.0668 | 0.7970 |
| Attitudes to economics pretest | - 0.15595735 | - 0.03990026 | 0.0288 | 1.9195 | 0.1710 |

TABLE X--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Attitudes to mathematics pretest | 0.08870957 | 0.02557396 | 0.0436 | 0.3448 | 0.5593 |
| Pretest--MDP | - 0.10001544 | - 0.76882421 | 0.9817 | 0.6133 | 0.4366 |
| Interaction of IQ and lecture | - 2.01661791 | - 0.07928219 | 0.0430 | 3.3936 | 0.0704 |
| Interaction of IQ and field trips | 1.08993590 | 0.04185453 | 0.0333 | 1.5844 | 0.2130 |
| Interaction of sex and lecture | - 0.11074857 | - 0.22644689 | 0.8097 | 0.0782 | 0.7807 |
| Interaction of sex and field trips | 0.03809774 | 0.07874922 | 0.8310 | 0.0090 | 0.9248 |
| Interaction of socio-economic status and lecture | 0.36050989 | 0.02075398 | 0.0257 | 0.6524 | 0.4225 |
| Interaction of socio-economic status and field trips | - 0.37929929 | - 0.02190189 | 0.0288 | 0.5784 | 0.4499 |

* Constant = 4.10375382

TABLE XI

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT ABILITY IN SELECTED MATHEMATICAL SKILLS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.02928034 | - 0.00036643 | 0.0015 | 0.0560 | 0.8138 |
| Lecture method | 0.34691492 | 2.64732808 | 8.0500 | 0.1081 | 0.7434 |
| Field-trip method | - 0.64869258 | - 4.95021113 | 6.1458 | 0.6488 | 0.4238 |
| Student sex | 0.19289156 | 2.41153020 | 1.0058 | 5.7488 | 0.0197 |
| Student IQ | 0.03484469 | 0.01875977 | 0.0591 | 0.1007 | 0.7521 |
| Student IQ--MDP | 0.05325127 | 1.21921621 | 2.2402 | 0.2965 | 0.5881 |
| Socioeconomic status | - 0.03520279 | - 0.01637090 | 0.0392 | 0.1741 | 0.6780 |
| Mathematics pretest | 0.04424060 | 0.05809079 | 0.1897 | 0.0937 | 0.7605 |
| Pretest--MDP | - 0.23806438 | - 3.04001301 | 4.7745 | 0.4054 | 0.5268 |
| Economics pretest | - 0.13649991 | - 0.42854551 | 0.3135 | 1.8689 | 0.1768 |
| Pretest--MDP | 0.15353476 | 1.95087494 | 4.6347 | 0.1772 | 0.6753 |
| Attitudes to mathematics pretest | - 0.19568441 | - 0.13758738 | 0.0783 | 3.0906 | 0.0839 |

TABLE XI--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | 0.00717441 | 0.13450586 | 1.8173 | 0.0055 | 0.9412 |
| Attitudes to economics pretest | - 0.00189280 | - 0.00118106 | 0.5421 | 0.0005 | 0.9827 |
| Interaction of IQ and lecture | - 0.01515908 | - 0.00145352 | 0.0814 | 0.0003 | 0.9858 |
| Interaction of IQ and field trips | 0.50273313 | 0.04708407 | 0.0616 | 0.5838 | 0.4478 |
| Interaction of sex and lecture | - 0.34534494 | - 1.72217097 | 1.4740 | 1.3650 | 0.2473 |
| Interaction of sex and field trips | 0.20939636 | 1.05562840 | 1.5263 | 0.4784 | 0.4919 |
| Interaction of socio-economic status and lecture | 0.08694843 | 0.01220790 | 0.0481 | 0.0643 | 0.8007 |
| Interaction of socio-economic status and field trips | - 0.20859723 | - 0.02937670 | 0.0538 | 0.2981 | 0.5872 |

*Constant = 3.47767746

TABLE XII

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT UNDERSTANDING OF SELECTED ECONOMIC CONCEPTS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | 0.05999708 | 0.00067425 | 0.0023 | 0.0881 | 0.7678 |
| Lecture method | 1.24237386 | 8.51365802 | 11.6293 | 0.5359 | 0.4672 |
| Field-trip method | - 0.16867226 | - 1.15586618 | 8.9560 | 0.0167 | 0.8978 |
| Student sex | - 0.03439586 | - 0.38615780 | 1.5396 | 0.0629 | 0.8029 |
| Student IQ | 0.03115820 | 0.01506407 | 0.0880 | 0.0293 | 0.8647 |
| Student IQ--MDP | 0.21584683 | 4.44004708 | 3.3939 | 1.7115 | 0.1962 |
| Socioeconomic status | - 0.06513257 | - 0.02720024 | 0.0571 | 0.2267 | 0.6359 |
| Economics pretest | - 0.19437240 | - 0.54799717 | 0.4923 | 1.2390 | 0.2705 |
| Pretest--MDP | - 0.26897715 | - 3.06914367 | 6.7117 | 0.2091 | 0.6493 |
| Mathematics pretest | - 0.19939472 | - 0.23511432 | 0.2781 | 0.7149 | 0.4015 |
| Pretest--MDP | - 0.01392172 | - 0.15964415 | 6.9500 | 0.0005 | 0.9818 |
| Attitudes to economics pretest | 0.07745308 | 0.05968764 | 0.1103 | 0.2927 | 0.5907 |

TABLE XII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Attitudes to mathematics pretest | - 0.11496340 | - 0.07258737 | 0.1185 | 0.3754 | 0.5426 |
| Pretest--MDP | 0.00533880 | 0.08988305 | 2.6634 | 0.0011 | 0.9732 |
| Interaction of IQ and lecture | - 0.79157077 | - 0.06815784 | 0.1185 | 0.3309 | 0.5675 |
| Interaction of IQ and field trips | - 0.09714478 | - 0.00817024 | 0.0904 | 0.0082 | 0.9283 |
| Interaction of sex and lecture | - 0.55620376 | - 2.49078476 | 2.1562 | 1.3344 | 0.2530 |
| Interaction of sex and field trips | 0.62862134 | 2.84583788 | 2.2614 | 1.5837 | 0.2135 |
| Interaction of socio-economic status and lecture | 0.14214293 | 0.01792188 | 0.0699 | 0.0658 | 0.7985 |
| Interaction of socio-economic status and field trips | - 0.21501035 | - 0.02719148 | 0.0790 | 0.1186 | 0.7319 |

*Constant = 8.51044992

TABLE XIII

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT ABILITY IN SELECTED MATHEMATICAL SKILLS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | 0.20283496 | 0.00180296 | 0.0015 | 1.5116 | 0.2241 |
| Lecture method | - 0.88971481 | - 4.82242807 | 7.6114 | 0.4014 | 0.5290 |
| Field-trip method | 0.40636356 | 2.20256990 | 5.8480 | 0.1419 | 0.7079 |
| Student sex | - 0.04424222 | - 0.39286788 | 1.0056 | 0.1526 | 0.6976 |
| Student IQ | 0.10163070 | 0.03886386 | 0.0573 | 0.4601 | 0.5004 |
| Student IQ--MDP | 0.14085355 | 2.29172425 | 2.2316 | 1.0546 | 0.3089 |
| Socioeconomic status | 0.07807148 | 0.02578802 | 0.0373 | 0.4790 | 0.4918 |
| Mathematics pretest | 0.16179722 | 0.15089940 | 0.1818 | 0.6887 | 0.4102 |
| Pretest--MDP | 0.49914209 | 4.52725925 | 4.5021 | 1.0112 | 0.3190 |
| Economics pretest | 0.24118531 | 0.53783072 | 0.3173 | 2.8739 | 0.0957 |
| Pretest--MDP | - 0.26103105 | - 2.35583589 | 4.3844 | 0.2887 | 0.5932 |
| Attitudes to mathematics pretest | - 0.10677985 | - 0.05332635 | 0.0775 | 0.4749 | 0.4936 |

TABLE XIII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | 0.18267492 | 2.43256446 | 1.7099 | 2.0238 | 0.1605 |
| Attitudes to economics pretest | 0.16241125 | 0.07197988 | 0.0523 | 1.8939 | 0.1753 |
| Interaction of IQ and lecture | 0.99480518 | 0.06775091 | 0.0771 | 0.7713 | 0.3837 |
| Interaction of IQ and field trips | - 0.31945463 | - 0.02125082 | 0.0591 | 0.1295 | 0.7203 |
| Interaction of sex and lecture | - 0.17124987 | - 0.60657370 | 1.4242 | 0.1814 | 0.6718 |
| Interaction of sex and field trips | - 0.45603575 | - 1.63294279 | 1.4832 | 1.2121 | 0.2757 |
| Interaction of socio-economic status and lecture | - 0.11122003 | - 0.01109155 | 0.0457 | 0.0590 | 0.8090 |
| Interaction of socio-economic status and field trips | 0.43306204 | 0.04331863 | 0.0513 | 0.7118 | 0.4025 |

*Constant = -15.36013072

TABLE XIV

REGRESSION COEFFICIENTS OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF ECONOMICS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | 0.23204570 | 0.00537795 | 0.0033 | 2.6324 | 0.1097 |
| Lecture method | - 0.29189446 | - 4.12515498 | 17.3643 | 0.0564 | 0.8130 |
| Field-trip method | 0.09561436 | 1.35125566 | 13.1480 | 0.0106 | 0.9185 |
| Student sex | 0.03596337 | 0.83266346 | 2.2036 | 0.1428 | 0.7068 |
| Student IQ | 0.04408987 | 0.04396017 | 0.1302 | 0.1140 | 0.7368 |
| Student IQ--MDP | 0.20768818 | 8.81060670 | 4.7705 | 3.4111 | 0.0695 |
| Socioeconomic status | 0.18684624 | 0.16091974 | 0.0835 | 3.7138 | 0.0585 |
| Attitudes to economics pretest | 0.13321458 | 0.15393814 | 0.1148 | 1.7971 | 0.1849 |
| Attitudes to mathematics pretest | - 0.25704519 | - 0.33470445 | 0.1602 | 4.3662 | 0.0407 |
| Pretest--MDP | - 0.03433535 | - 1.19213764 | 3.9651 | 0.0904 | 0.7647 |
| Economics pretest | 0.10230649 | 0.59483624 | 0.6869 | 0.7500 | 0.3898 |
| Pretest--MDP | 0.10683887 | 2.51409458 | 10.0056 | 0.0631 | 0.8024 |

TABLE XIV--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Mathematics pretest | 0.03491967 | 0.08491534 | 0.4114 | 0.0426 | 0.8371 |
| Pretest--MDP | - 0.06642099 | - 1.57078238 | 10.1795 | 0.0238 | 0.8779 |
| Interaction of IQ and lecture | 0.59870004 | 0.10631288 | 0.1742 | 0.3725 | 0.5438 |
| Interaction of IQ and field trips | - 0.73750815 | - 0.12791837 | 0.1314 | 0.9476 | 0.3341 |
| Interaction of sex and lecture | - 0.14042821 | - 1.29690203 | 3.2419 | 0.1600 | 0.6905 |
| Interaction of sex and field trips | 0.36810076 | 3.43667345 | 3.3301 | 1.0650 | 0.3060 |
| Interaction of socio-economic status and lecture | - 0.05829439 | - 0.01515778 | 0.1042 | 0.0212 | 0.8848 |
| Interaction of socio-economic status and field trips | 0.30215684 | 0.07880549 | 0.1115 | 0.4995 | 0.4823 |

*Constant = -16.02270669

TABLE XV

REGRESSION COEFFICIENTS OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF MATHEMATICS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.19699749 | - 0.00424671 | 0.0026 | 2.7190 | 0.1041 |
| Lecture method | - 1.08688917 | -14.28724412 | 13.3860 | 1.1392 | 0.2899 |
| Field-trip method | 1.09160126 | 14.34918492 | 10.0620 | 2.0337 | 0.1588 |
| Student sex | 0.00254402 | 0.05478701 | 1.7152 | 0.0010 | 0.9746 |
| Student IQ | - 0.06634557 | - 0.06152919 | 0.1010 | 0.3709 | 0.5447 |
| Student IQ--MDP | - 0.24718162 | - 9.75346608 | 3.6043 | 7.3228 | 0.0087 |
| Socioeconomic status | - 0.21646455 | - 0.17340457 | 0.0631 | 7.5437 | 0.0078 |
| Attitudes to mathematics pretest | 0.48390379 | 0.58608394 | 0.1055 | 30.8562 | 0.0000 |
| Pretest--MDP | - 0.04799384 | - 1.54995532 | 3.0788 | 0.2534 | 0.6164 |
| Attitudes to economics pretest | - 0.02972275 | - 0.03194716 | 0.0905 | 0.1247 | 0.7251 |
| Mathematics pretest | - 0.13819247 | - 0.31257130 | 0.3175 | 0.9692 | 0.3286 |
| Pretest--MDP | 0.16916562 | 3.72110168 | 7.9020 | 0.2218 | 0.6393 |

TABLE XV--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Economics pretest | - 0.12439027 | - 0.67271237 | 0.5305 | 1.6083 | 0.2094 |
| Pretest--MDP | - 0.30530048 | - 6.68234074 | 7.7374 | 0.7459 | 0.3911 |
| Interaction of IQ and lecture | 0.50481105 | 0.08337853 | 0.1354 | 0.3791 | 0.5403 |
| Interaction of IQ and field trips | - 0.19064759 | - 0.03075716 | 0.1029 | 0.0894 | 0.7659 |
| Interaction of sex and lecture | 0.15235676 | 1.30876992 | 2.5183 | 0.2710 | 0.6051 |
| Interaction of sex and field trips | - 0.46662008 | - 4.05213369 | 2.5605 | 2.5045 | 0.1185 |
| Interaction of socio-economic status and lecture | 0.38580316 | 0.09330895 | 0.0802 | 1.3540 | 0.2489 |
| Interaction of socio-economic status and field trips | - 0.49378845 | - 0.11978812 | 0.0857 | 1.9530 | 0.1672 |

*Constant = 32.88406690

TABLE XVI

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF ECONOMICS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.02199320 | - 0.00053578 | 0.0030 | 0.0315 | 0.8597 |
| Lecture method | - 0.86870800 | -12.90465739 | 15.6082 | 0.6836 | 0.4117 |
| Field-trip method | - 0.08314092 | - 1.23505838 | 12.0387 | 0.0105 | 0.9186 |
| Student sex | 0.06102511 | 1.48516915 | 2.0437 | 0.5281 | 0.4703 |
| Student IQ | 0.00460742 | 0.00482877 | 0.1153 | 0.0018 | 0.9667 |
| Student IQ--MDP | 0.06341554 | 2.82779525 | 4.3600 | 0.4207 | 0.5191 |
| Socioeconomic status | - 0.03178197 | - 0.02877160 | 0.0765 | 0.1416 | 0.7081 |
| Attitudes to economics pretest | - 0.07654425 | - 0.09297481 | 0.1048 | 0.7876 | 0.3784 |
| Attitudes to mathematics pretest | 0.01198624 | 0.01640564 | 0.1564 | 0.0110 | 0.9168 |
| Pretest--MDP | 0.04831644 | 1.76334822 | 3.5333 | 0.2491 | 0.6196 |
| Economics pretest | 0.00102475 | 0.00626285 | 0.6203 | 0.0001 | 0.9920 |
| Pretest--MDP | - 0.50440911 | -12.47652118 | 8.8964 | 1.9668 | 0.1660 |

TABLE XVI--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Mathematics pretest | 0.01198624 | 0.01640564 | 0.1564 | 0.0110 | 0.9168 |
| Pretest--MDP | 0.04831644 | 1.76334822 | 3.5333 | 0.2491 | 0.6196 |
| Interaction of IQ and lecture | 0.36664617 | 0.06843559 | 0.1584 | 0.1866 | 0.6673 |
| Interaction of IQ and field trips | - 0.09048937 | - 0.01649764 | 0.1206 | 0.0187 | 0.8917 |
| Interaction of sex and lecture | 0.11271098 | 1.09424807 | 2.9014 | 0.1422 | 0.7074 |
| Interaction of sex and field trips | - 0.19004382 | - 1.86502023 | 2.9758 | 0.3928 | 0.5332 |
| Interaction of socio-economic status and lecture | 0.44296716 | 0.12107055 | 0.0925 | 1.7128 | 0.1957 |
| Interaction of socio-economic status and field trips | 0.49306130 | 0.13517090 | 0.1036 | 1.7018 | 0.1971 |

*Constant = -10.62672694

TABLE XVII

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF MATHEMATICS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.03323661 | - 0.00069296 | 0.0023 | 0.0880 | 0.7678 |
| Lecture method | - 0.11312756 | - 1.43824676 | 12.1536 | 0.0140 | 0.9062 |
| Field-trip method | 1.39521523 | 17.73806304 | 9.0317 | 3.8572 | 0.0542 |
| Student sex | - 0.01714494 | - 0.35710472 | 1.5888 | 0.0505 | 0.8229 |
| Student IQ | - 0.05504253 | - 0.04937072 | 0.0890 | 0.3076 | 0.5813 |
| Student IQ--MDP | - 0.10374949 | - 3.95941077 | 3.3485 | 1.3982 | 0.2417 |
| Socioeconomic status | 0.07055521 | 0.05466441 | 0.0588 | 0.8629 | 0.3567 |
| Attitudes to mathematics pretest | 0.21898155 | 0.25651343 | 0.1164 | 4.8544 | 0.0315 |
| Pretest--MDP | 0.05710445 | 1.78363276 | 2.7317 | 0.4263 | 0.5163 |
| Attitudes to economics pretest | - 0.01967021 | - 0.02044815 | 0.0816 | 0.0628 | 0.8030 |
| Mathematics pretest | 0.11317413 | 0.24757892 | 0.2846 | 0.7566 | 0.3879 |
| Pretest--MDP | 0.28703723 | 6.10659951 | 7.1834 | 0.7227 | 0.3987 |

TABLE XVII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Economics pretest | - 0.01581748 | - 0.08273361 | 0.4802 | 0.0297 | 0.8638 |
| Pretest--MDP | - 0.13903675 | - 2.94328649 | 6.9918 | 0.1772 | 0.6753 |
| Interaction of IQ and lecture | 0.29702872 | 0.04744884 | 0.1227 | 0.1496 | 0.7003 |
| Interaction of IQ and field trips | - 0.86104150 | - 0.13435095 | 0.0918 | 2.1435 | 0.1485 |
| Interaction of sex and lecture | - 0.09277425 | - 0.77078069 | 2.2470 | 0.1177 | 0.7328 |
| Interaction of sex and field trips | 0.12220348 | 1.02637414 | 2.3079 | 0.1978 | 0.6581 |
| Interaction of socio-economic status and lecture | - 0.06418281 | - 0.01501336 | 0.0726 | 0.0427 | 0.8370 |
| Interaction of socio-economic status and field trips | - 0.76222783 | - 0.17883784 | 0.0780 | 5.2600 | 0.0254 |

*Constant = 3.68902445

TABLE XVIII

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF ECONOMICS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.00989241 | - 0.00024919 | 0.0030 | 0.0069 | 0.9342 |
| Lecture method | - 0.18227534 | - 2.79980244 | 15.4390 | 0.0329 | 0.8568 |
| Field-trip method | 0.26043703 | 4.00038877 | 11.8254 | 0.1144 | 0.7364 |
| Student sex | - 0.10128219 | - 2.54875000 | 2.0066 | 1.6134 | 0.2093 |
| Student IQ | 0.17559904 | 0.19029514 | 0.1134 | 2.8138 | 0.0991 |
| Student IQ--MDP | 0.14946414 | 6.80153671 | 4.4587 | 2.3890 | 0.1279 |
| Socioeconomic status | 0.01922949 | 0.01800022 | 0.0756 | 0.0567 | 0.8127 |
| Attitudes to economics pretest | - 0.06472962 | - 0.08129850 | 0.1070 | 0.5775 | 0.4506 |
| Attitudes to mathematics pretest | 0.04193737 | 0.05935239 | 0.1569 | 0.1431 | 0.7067 |
| Pretest--MDP | 0.02222398 | 0.83867139 | 3.5181 | 0.0568 | 0.8125 |
| Economics pretest | 0.03474836 | 0.21959055 | 0.6573 | 0.1116 | 0.7396 |
| Pretest--MDP | - 0.15392579 | - 3.93684933 | 8.8710 | 0.1969 | 0.6589 |

TABLE XVIII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Mathematics pretest | - 0.13434375 | - 0.35507366 | 0.3668 | 0.9372 | 0.3372 |
| Pretest--MDP | 0.12000322 | 3.08452720 | 9.1755 | 0.1130 | 0.7380 |
| Interaction of IQ and lecture | - 0.26792985 | - 0.05171098 | 0.1569 | 0.1086 | 0.7430 |
| Interaction of IQ and field trips | - 0.53740485 | - 0.10131009 | 0.1187 | 0.7279 | 0.3973 |
| Interaction of sex and lecture | 0.17926927 | 1.79946621 | 2.8737 | 0.3921 | 0.5338 |
| Interaction of sex and field trips | 0.27291727 | 2.76941237 | 3.0082 | 0.8475 | 0.3613 |
| Interaction of socio-economic status and lecture | 0.30873723 | 0.08725349 | 0.0916 | 0.9067 | 0.3452 |
| Interaction of socio-economic status and field trips | 0.18923189 | 0.05364181 | 0.1042 | 0.2649 | 0.6088 |

*Constant = -14.21725823

TABLE XIX

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF MATHEMATICS (LECTURE AND FIELD TRIPS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 1* | - 0.13967315 | - 0.00299766 | 0.0027 | 1.1949 | 0.2791 |
| Lecture method | - 0.09321154 | - 1.21985785 | 14.2439 | 0.0073 | 0.9321 |
| Field-trip method | 0.41804558 | 5.47095542 | 10.8939 | 0.2522 | 0.6175 |
| Student sex | 0.04894152 | 1.04932894 | 1.8725 | 0.3141 | 0.5775 |
| Student IQ | - 0.17063006 | - 0.15754374 | 0.1052 | 2.2445 | 0.1398 |
| Student IQ--MDP | - 0.19516553 | - 7.66694345 | 4.0718 | 3.5455 | 0.0650 |
| Socioeconomic status | - 0.09560102 | - 0.07624522 | 0.0690 | 1.2203 | 0.2741 |
| Attitudes to mathematics pretest | 0.16351221 | 0.19716386 | 0.1425 | 1.9156 | 0.1719 |
| Pretest--MDP | - 0.09290320 | - 2.98703766 | 3.2216 | 0.8597 | 0.3579 |
| Attitudes to economics pretest | 0.11096544 | 0.11874281 | 0.0979 | 1.4712 | 0.2303 |
| Mathematics pretest | 0.00103071 | 0.00232100 | 0.3412 | 0.0000 | 0.9946 |
| Pretest--MDP | - 0.10225070 | - 2.23924722 | 8.4666 | 0.0699 | 0.7924 |

TABLE XIX--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Economics pretest | - 0.27663054 | - 1.48942788 | 0.5727 | 6.7647 | 0.0119 |
| Pretest--MDP | - 0.01581604 | - 0.34464748 | 8.1969 | 0.0018 | 0.9666 |
| Interaction of IQ and lecture | 0.39636246 | 0.06517698 | 0.1446 | 0.2032 | 0.6539 |
| Interaction of IQ and field trips | - 0.24800382 | - 0.03983360 | 0.1101 | 0.1308 | 0.7189 |
| Interaction of sex and lecture | - 0.21596837 | - 1.84700497 | 2.6484 | 0.4864 | 0.4885 |
| Interaction of sex and field trips | 0.08399495 | 0.72618932 | 2.7943 | 0.0675 | 0.7959 |
| Interaction of socio-economic status and lecture | - 0.14862116 | - 0.03578611 | 0.0851 | 0.1769 | 0.6757 |
| Interaction of socio-economic status and field trips | - 0.55729192 | - 0.13459593 | 0.0946 | 2.0227 | 0.1606 |

*Constant = 41.69539295

TABLE XX

REGRESSION COEFFICIENTS OF STUDENT UNDERSTANDING OF SELECTED ECONOMIC CONCEPTS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | 0.27880922 | 0.02017631 | 0.0079 | 6.5366 | 0.0122 |
| Lecture method | 1.39223760 | 5.62553604 | 3.3649 | 2.7950 | 0.0979 |
| Games/simulations method | - 0.77692720 | - 3.12045813 | 3.2899 | 0.8996 | 0.3454 |
| Student sex | - 0.16492705 | - 1.07416000 | 0.5488 | 3.8309 | 0.0533 |
| Student IQ | 0.27436816 | 0.05888361 | 0.0227 | 6.7377 | 0.0110 |
| Student IQ--MDP | - 0.00257025 | - 0.04105960 | 1.4370 | 0.0008 | 0.9773 |
| Socioeconomic status | 0.10872810 | 0.02184684 | 0.0189 | 1.3397 | 0.2501 |
| Economics pretest | 0.12713835 | 0.13374914 | 0.1256 | 1.1346 | 0.2895 |
| Pretest--MDP | - 0.22653376 | - 1.47187849 | 2.6572 | 0.3068 | 0.5810 |
| Mathematics pretest | - 0.08865486 | - 0.05209253 | 0.0646 | 0.6499 | 0.4222 |
| Pretest--MDP | 0.10116058 | 0.65679065 | 2.4107 | 0.0742 | 0.7859 |
| Attitudes to economics pretest | 0.13175439 | 0.04551774 | 0.0335 | 1.8446 | 0.1777 |

TABLE XX--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Attitudes to mathematics pretest | - 0.00588417 | - 0.00229044 | 0.0414 | 0.0031 | 0.9560 |
| Pretest--MDP | 0.17164332 | 1.11440374 | 2.6431 | 0.1778 | 0.6743 |
| Interaction of IQ and lecture | - 0.83066990 | - 0.03482939 | 0.0263 | 1.7520 | 0.1889 |
| Interaction of IQ and games/simulations | 0.55611439 | 0.02333339 | 0.0266 | 0.7718 | 0.3819 |
| Interaction of sex and lecture | - 0.24965398 | - 0.60735604 | 0.7723 | 0.6184 | 0.4337 |
| Interaction of sex and games/ simulations | 0.18316338 | 0.46095539 | 0.7479 | 0.3798 | 0.5392 |
| Interaction of socio-economic status and lecture | 0.04085408 | 0.00336838 | 0.0262 | 0.0165 | 0.8981 |
| Interaction of socio-economic status and games/simulations | 0.01605080 | 0.00131693 | 0.0244 | 0.0029 | 0.9570 |

*Constant = 1.74121997

TABLE XXI

REGRESSION COEFFICIENTS OF STUDENT ABILITY IN SELECTED MATHEMATICAL SKILLS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | - 0.34126720 | - 0.05498285 | 0.0174 | 9.9676 | 0.0022 |
| Lecture method | 0.18026351 | 1.62164764 | 7.6659 | 0.0447 | 0.8329 |
| Games/simulations method | 0.52777726 | 4.71940032 | 7.4053 | 0.4062 | 0.5255 |
| Student sex | 0.05649047 | 0.81912540 | 1.2545 | 0.4263 | 0.5154 |
| Student IQ | - 0.4930950 | - 0.02356076 | 0.0527 | 0.1999 | 0.6559 |
| Student IQ--MDP | 0.00853099 | 0.30341439 | 3.2257 | 0.0088 | 0.9253 |
| Socioeconomic status | - 0.08461401 | - 0.03785186 | 0.0425 | 0.7933 | 0.3754 |
| Mathematics pretest | 0.37332272 | 0.48837724 | 0.1364 | 12.8252 | 0.0005 |
| Pretest--MDP | 0.06375473 | 0.92156550 | 5.4132 | 0.0290 | 0.8652 |
| Economics pretest | 0.11680142 | 0.27351509 | 0.2822 | 0.9399 | 0.3348 |
| Pretest--MDP | - 0.22135358 | - 3.20201740 | 5.9659 | 0.2881 | 0.5928 |
| Attitudes to mathematics pretest | 0.02334730 | 0.02023335 | 0.0930 | 0.0473 | 0.8282 |

TABLE XXI--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | 0.18270391 | 2.64095868 | 5.9327 | 0.1982 | 0.6573 |
| Attitudes to economics pretest | 0.01375387 | 0.01057886 | 0.0760 | 0.0194 | 0.8896 |
| Interaction of IQ and lecture | 0.27824331 | 0.02597408 | 0.0596 | 0.1901 | 0.6638 |
| Interaction of IQ and games/simulations | - 0.63173378 | - 0.05901276 | 0.0596 | 0.9819 | 0.3243 |
| Interaction of sex and lecture | - 0.11233370 | - 0.60843338 | 1.7385 | 0.1225 | 0.7272 |
| Interaction of sex and games/ simulations | - 0.18400871 | - 1.03099545 | 1.6791 | 0.3770 | 0.5407 |
| Interaction of socio-economic status and lecture | - 0.49026318 | - 0.08999382 | 0.0581 | 2.3967 | 0.1250 |
| Interaction of socio-economic status and games/simulations | 0.19322964 | 0.03529688 | 0.0546 | 0.4185 | 0.5193 |

*Constant = 7.12113480

TABLE XXII

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT UNDERSTANDING OF SELECTED ECONOMIC CONCEPTS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | 0.02275469 | 0.00196052 | 0.0109 | 0.0321 | 0.8581 |
| Lecture method | 0.76607990 | 3.68545317 | 4.4812 | 0.6764 | 0.4130 |
| Games/simulations method | - 0.66437241 | - 3.17699040 | 4.3389 | 0.5361 | 0.4660 |
| Student sex | 0.09187472 | 0.71242537 | 0.7343 | 0.9414 | 0.3345 |
| Student IQ | 0.17623858 | 0.04503270 | 0.0313 | 2.0721 | 0.1535 |
| Student IQ--MDP | 0.02373428 | 0.45142044 | 1.8344 | 0.0574 | 0.8112 |
| Socioeconomic status | 0.12521476 | 0.02995496 | 0.0251 | 1.4236 | 0.2359 |
| Economics pretest | 0.10637099 | 0.13323058 | 0.1655 | 0.6479 | 0.4230 |
| Pretest--MDP | - 0.48305437 | - 3.73681265 | 3.4902 | 1.1463 | 0.2872 |
| Mathematics pretest | 0.11834225 | 0.08279021 | 0.0917 | 0.8159 | 0.3688 |
| Pretest--MDP | 0.10608623 | 0.82005114 | 3.1913 | 0.0660 | 0.7978 |
| Attitudes to economics pretest | - 0.10088778 | - 0.04972380 | 0.0444 | 1.2537 | 0.2658 |

TABLE XXII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Attitudes to mathematics pretest | 0.18518695 | 0.08582417 | 0.0542 | 2.5033 | 0.1171 |
| Pretest--MDP | 0.25100233 | 1.94025894 | 3.4981 | 0.3077 | 0.5805 |
| Interaction of IQ and lecture | - 0.91213495 | - 0.04553473 | 0.0352 | 1.6781 | 0.1985 |
| Interaction of IQ and games/simulations | 1.08820474 | 0.05436140 | 0.0350 | 2.4141 | 0.1238 |
| Interaction of sex and lecture | - 0.10840826 | - 0.314002 | 1.0237 | 0.0941 | 0.7598 |
| Interaction of sex and games/ simulations | - 0.18349430 | - 0.59980555 | 0.9997 | 0.3025 | 0.5837 |
| Interaction of socio-economic status and lecture | 0.41449320 | 0.04068825 | 0.0365 | 1.2431 | 0.2678 |
| Interaction of socio-economic status and games/simulations | - 0.16451992 | - 0.01607123 | 0.0320 | 0.2523 | 0.6166 |

*Constant = -3.87885877

TABLE XXIII

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT ABILITY IN SELECTED MATHEMATICAL SKILLS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | - 0.16065565 | - 0.02628879 | 0.0141 | 3.4575 | 0.0663 |
| Lecture method | 0.23230304 | 2.12248935 | 5.9093 | 0.1290 | 0.7203 |
| Games/simulations method | 0.03444863 | 0.31286004 | 5.7060 | 0.0030 | 0.9564 |
| Student sex | - 0.06767358 | - 0.99663542 | 0.9758 | 1.0432 | 0.3098 |
| Student IQ | 0.01462412 | 0.00709693 | 0.0415 | 0.0292 | 0.8647 |
| Student IQ--MDP | 0.02997391 | 1.08273508 | 2.4752 | 0.1913 | 0.6629 |
| Socioeconomic status | - 0.11161419 | - 0.05071149 | 0.0327 | 2.3991 | 0.1250 |
| Mathematics pretest | 0.28354524 | 0.37673442 | 0.1139 | 10.9493 | 0.0014 |
| Pretest--MDP | 0.36398205 | 5.34362148 | 4.1493 | 1.6585 | 0.2012 |
| Economics pretest | - 0.02347978 | - 0.05585326 | 0.2180 | 0.0656 | 0.7984 |
| Pretest--MDP | - 0.09132003 | - 1.34166820 | 4.6032 | 0.0850 | 0.7714 |
| Attitudes to mathematics pretest | - 0.03448198 | - 0.0303545 | 0.0723 | 0.1760 | 0.6758 |

TABLE XXIII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | - 0.39699765 | - 5.82832368 | 4.5513 | 1.6399 | 0.2037 |
| Attitudes to economics pretest | - 0.01185490 | - 0.00926091 | 0.0592 | 0.0244 | 0.8761 |
| Interaction of IQ and lecture | - 0.48069900 | - 0.04557542 | 0.0463 | 0.9703 | 0.3273 |
| Interaction of IQ and games/simulations | - 0.38856613 | - 0.03686538 | 0.0463 | 0.6331 | 0.4284 |
| Interaction of sex and lecture | - 0.26019766 | - 1.43135817 | 1.3374 | 1.1455 | 0.2874 |
| Interaction of sex and games/simulations | 0.37828366 | 2.15267226 | 1.2974 | 2.7530 | 0.1006 |
| Interaction of socioeconomic status and lecture | 0.73853117 | 0.13768740 | 0.0461 | 8.9361 | 0.0036 |
| Interaction of socioeconomic status and games/simulations | 0.17532328 | 0.03252701 | 0.0419 | 0.6027 | 0.4396 |

*Constant = 9.94246400

TABLE XXIV

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT UNDERSTANDING OF SELECTED ECONOMIC CONCEPTS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | 0.16324615 | 0.01664526 | 0.0145 | 1.3206 | 0.2537 |
| Lecture method | - 0.71115440 | - 4.04881142 | 5.9581 | 0.4618 | 0.4986 |
| Games/simulations method | - 0.14725584 | - 0.83334272 | 5.8111 | 0.0206 | 0.8863 |
| Student sex | 0.12432923 | 1.14094164 | 0.9836 | 1.3455 | 0.2493 |
| Student IQ | - 0.03965011 | - 0.01198997 | 0.0417 | 0.0828 | 0.7743 |
| Student IQ--MDP | 0.04827620 | 1.08663823 | 2.5200 | 0.1859 | 0.6674 |
| Socioeconomic status | - 0.18189607 | - 0.05149716 | 0.0334 | 2.3825 | 0.1265 |
| Economics pretest | - 0.29990222 | - 0.44453627 | 0.2189 | 4.1251 | 0.0454 |
| Pretest--MDP | 0.82667655 | 7.56811544 | 4.7277 | 2.5626 | 0.1132 |
| Mathematics pretest | - 0.05960008 | - 0.04934383 | 0.1303 | 0.1433 | 0.7059 |
| Pretest--MDP | 0.16714818 | 1.53908071 | 4.3438 | 0.1239 | 0.7257 |
| Attitudes to economics pretest | 0.10840974 | 0.05277121 | 0.0609 | 0.7503 | 0.3888 |

TABLE XXIV--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Attitudes to mathematics pretest | - 0.12769200 | - 0.07003414 | 0.0727 | 0.9280 | 0.3381 |
| Pretest--MDP | - 0.85037421 | - 7.77926981 | 4.7857 | 2.6423 | 0.1078 |
| Interaction of IQ and lecture | 0.61353111 | 0.03624658 | 0.0469 | 0.5967 | 0.4420 |
| Interaction of IQ and games/simulations | 0.34309123 | 0.02628320 | 0.0468 | 0.1880 | 0.6657 |
| Interaction of sex and lecture | - 0.59940939 | - 2.05466731 | 1.3492 | 2.3190 | 0.1315 |
| Interaction of sex and games/simulations | - 0.52637963 | - 1.86651908 | 1.3237 | 1.9883 | 0.1622 |
| Interaction of socioeconomic status and lecture | 0.71002714 | 0.08248469 | 0.0483 | 2.9142 | 0.0915 |
| Interaction of socioeconomic status and games/simulations | 0.53958686 | 0.06237907 | 0.0440 | 2.0064 | 0.1603 |

*Constant = 5.33766636

TABLE XXV

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT ABILITY IN SELECTED MATHEMATICAL SKILLS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | - 0.09784875 | - 0.01581164 | 0.0186 | 0.7195 | 0.3987 |
| Lecture method | 0.81156743 | 7.32254982 | 7.6197 | 0.9235 | 0.3393 |
| Games/simulations method | - 0.22156858 | - 1.98716252 | 7.4498 | 0.0712 | 0.7903 |
| Student sex | - 0.03121633 | - 0.45398980 | 1.2704 | 0.1277 | 0.7217 |
| Student IQ | - 0.02991582 | - 0.01433669 | 0.0534 | 0.0719 | 0.7892 |
| Student IQ--MDP | - 0.10318989 | - 3.68097724 | 3.2101 | 1.3149 | 0.2547 |
| Socioeconomic status | 0.08781344 | 0.03939990 | 0.0432 | 0.8328 | 0.3640 |
| Mathematics pretest | 0.39291510 | 0.51553573 | 0.1575 | 10.7084 | 0.0015 |
| Pretest--MDP | - 0.90982425 | -13.19047200 | 5.3855 | 5.9989 | 0.0164 |
| Economics pretest | - 0.02854165 | - 0.06704270 | 0.2874 | 0.0544 | 0.8161 |
| Pretest--MDP | 0.44703952 | 6.48592792 | 6.1136 | 1.1255 | 0.2917 |
| Attitudes to mathematics pretest | - 0.03336381 | - 0.02899985 | 0.0937 | 0.0958 | 0.7577 |

TABLE XXV--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | 0.13000828 | 1.88483711 | 6.2294 | 0.0915 | 0.7630 |
| Attitudes to economics pretest | - 0.00874515 | - 0.00674637 | 0.0785 | 0.0074 | 0.9317 |
| Interaction of IQ and lecture | - 0.77668738 | - 0.07271949 | 0.0599 | 1.4757 | 0.2278 |
| Interaction of IQ and games/simulations | - 0.19818124 | - 0.01856793 | 0.0600 | 0.0957 | 0.7578 |
| Interaction of sex and lecture | - 0.03268623 | - 0.17756482 | 1.7538 | 0.0103 | 0.9196 |
| Interaction of sex and games/simulations | 0.34233877 | 1.92381596 | 1.7046 | 1.2738 | 0.2622 |
| Interaction of socio-economic status and lecture | - 0.02465024 | - 0.00453830 | 0.0630 | 0.0052 | 0.9428 |
| Interaction of socio-economic status and games/simulations | 0.20243794 | 0.03708887 | 0.0570 | 0.4234 | 0.5170 |

*Constant = 9.21826832

TABLE XXVI

REGRESSION COEFFICIENTS OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF ECONOMICS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | - 0.9457138 | - 0.02238565 | 0.0292 | 0.5862 | 0.4458 |
| Lecture method | - 0.65189394 | - 8.61594339 | 12.2336 | 0.4960 | 0.4830 |
| Games/simulations method | - 0.06165255 | - 0.80996156 | 11.8724 | 0.0047 | 0.9458 |
| Student sex | - 0.10174835 | - 2.16760326 | 1.9988 | 1.1760 | 0.2810 |
| Student IQ | 0.05773910 | 0.01053275 | 0.0843 | 0.2312 | 0.6318 |
| Student IQ--MDP | - 0.15208622 | - 7.94701468 | 5.0936 | 2.4342 | 0.1221 |
| Socioeconomic status | - 0.20627476 | - 0.13557148 | 0.0668 | 4.1191 | 0.0453 |
| Attitudes to economics pretest | 0.28759078 | 0.32498695 | 0.1167 | 7.7496 | 0.0065 |
| Attitudes to mathematics pretest | - 0.15692763 | - 0.19980563 | 0.1473 | 1.8389 | 0.1784 |
| Pretest--MDP | 0.17510307 | 3.71864531 | 9.4932 | 0.1534 | 0.6962 |
| Economics pretest | 0.17828553 | 0.61348771 | 0.4492 | 1.8655 | 0.1753 |

TABLE XXVI--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | - 0.44592860 | - 9.47719234 | 9.5076 | 0.9936 | 0.3215 |
| Mathematics pretest | 0.09727661 | 0.18696343 | 0.2321 | 0.6491 | 0.4225 |
| Pretest--MDP | 0.18012785 | 3.82535593 | 0.6519 | 0.1955 | 0.6594 |
| Interaction of IQ and lecture | 0.69039761 | 0.09468736 | 0.0949 | 0.9959 | 0.3209 |
| Interaction of IQ and games/simulations | 0.03970100 | 0.00544867 | 0.0958 | 0.0032 | 0.9548 |
| Interaction of sex and lecture | 0.36870089 | 2.93396135 | 2.7661 | 1.1250 | 0.2916 |
| Interaction of sex and games/ simulations | 0.24981280 | 2.05641275 | 2.6831 | 0.5874 | 0.4454 |
| Interaction of socio-economic status and lecture | - 0.29207447 | - 0.07876880 | 0.0938 | 0.7046 | 0.4034 |
| Interaction of socio-economic status and games/simulations | - 0.23229597 | - 0.06234211 | 0.0872 | 0.5106 | 0.4767 |

*Constant = 30.37486467

TABLE XXVII

REGRESSION COEFFICIENTS OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF MATHEMATICS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | 0.17357974 | 0.03532580 | 0.0256 | 1.8970 | 0.1717 |
| Lecture method | 0.79573430 | 9.04226130 | 10.7954 | 0.7016 | 0.4044 |
| Games/simulations method | - 0.84591553 | - 9.55484080 | 10.4412 | 0.8374 | 0.3625 |
| Student sex | - 0.12392402 | - 2.26981785 | 1.7612 | 1.6610 | 0.2007 |
| Student IQ | - 0.11285326 | - 0.06811350 | 0.0742 | 0.8422 | 0.3612 |
| Student IQ--MDP | 0.15214818 | 6.83540073 | 4.5029 | 2.3043 | 0.1324 |
| Socioeconomic status | 0.24718566 | 0.13967819 | 0.0585 | 5.6943 | 0.0191 |
| Attitudes to mathematics pretest | 0.36742953 | 0.40222166 | 0.1246 | 10.4221 | 0.0017 |
| Pretest--MDP | 0.48066903 | 8.77646601 | 8.3435 | 1.1065 | 0.2956 |
| Attitudes to economics pretest | - 0.18108725 | - 0.17593892 | 0.1058 | 2.7648 | 0.0997 |
| Mathematics pretest | 0.13149354 | 0.21728799 | 0.2045 | 1.1293 | 0.2907 |

TABLE XXVII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | - 0.22328832 | - 4.07699403 | 7.6396 | 0.2848 | 0.5949 |
| Economics pretest | - 0.04194062 | - 0.12408168 | 0.4006 | 0.0959 | 0.7575 |
| Pretest--MDP | - 0.14363893 | - 2.62463913 | 8.4400 | 0.0967 | 0.7565 |
| Interaction of IQ and lecture | - 0.80744124 | - 0.09521091 | 0.0837 | 1.2944 | 0.2582 |
| Interaction of IQ and games/simulations | 0.57414314 | 0.06774735 | 0.0843 | 0.6456 | 0.4238 |
| Interaction of sex and lecture | - 0.14933115 | - 1.02167718 | 2.4563 | 0.1730 | 0.6784 |
| Interaction of sex and games/ simulations | 0.09579131 | 0.67796116 | 2.3768 | 0.0814 | 0.7761 |
| Interaction of socio-economic status and lecture | 0.04401351 | 0.01020539 | 0.0832 | 0.0150 | 0.9027 |
| Interaction of socio-economic status and games/simulations | 0.06170894 | 0.01423872 | 0.0773 | 0.0340 | 0.8542 |

*Constant = 4.99409472

TABLE XXVIII

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF ECONOMICS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | - 0.12353968 | - 0.02992353 | 0.0315 | 0.9035 | 0.3444 |
| Lecture method | - 0.68763284 | - 9.29991528 | 12.9448 | 0.5161 | 0.4744 |
| Games/simulations method | 0.19663728 | 2.64347820 | 12.5239 | 0.0446 | 0.8333 |
| Student sex | - 0.15603958 | - 3.40160343 | 2.1242 | 2.5644 | 0.1129 |
| Student IQ | - 0.06049750 | - 0.04345803 | 0.0911 | 0.2277 | 0.6344 |
| Student IQ--MDP | - 0.07130941 | - 3.81291831 | 5.4247 | 0.4940 | 0.4840 |
| Socioeconomic status | - 0.02764894 | - 0.01859504 | 0.0728 | 0.0652 | 0.7990 |
| Attitudes to economics pretest | 0.15177632 | 0.17550580 | 0.1287 | 1.8598 | 0.1761 |
| Attitudes to mathematics pretest | - 0.10635393 | - 0.13856653 | 0.1583 | 0.7664 | 0.3837 |
| Pretest--MDP | - 0.04432629 | - 0.96327190 | 10.0840 | 0.0091 | 0.9241 |
| Economics pretest | - 0.06868086 | - 0.24183656 | 0.4781 | 0.2559 | 0.6142 |

TABLE XXVIII--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | - 0.08970896 | - 1.95095243 | 10.1085 | 0.0372 | 0.8474 |
| Mathematics pretest | - 0.03038561 | - 0.05976029 | 0.2650 | 0.0509 | 0.8221 |
| Pretest--MDP | 0.16029510 | 3.48343517 | 9.1871 | 0.1438 | 0.7055 |
| Interaction of IQ and lecture | 0.16264359 | 0.02282581 | 0.1021 | 0.0500 | 0.8236 |
| Interaction of IQ and games/simulations | - 0.19431755 | - 0.02728963 | 0.1020 | 0.0715 | 0.7898 |
| Interaction of sex and lecture | 0.24259279 | 1.97539793 | 2.9476 | 0.4491 | 0.5045 |
| Interaction of sex and games/ simulations | 0.27686938 | 2.33220660 | 2.8818 | 0.6549 | 0.4205 |
| Interaction of socio-economic status and lecture | 0.30487812 | 0.08413629 | 0.1057 | 0.6330 | 0.4284 |
| Interaction of socio-economic status and games/simulations | - 0.16276388 | - 0.04469864 | 0.0922 | 0.2352 | 0.6289 |

*Constant = 22.66019745

TABLE XXIX

REGRESSION COEFFICIENTS OF SHORT-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF MATHEMATICS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | - 0.12810397 | - 0.02673218 | 0.0294 | 0.8273 | 0.3655 |
| Lecture method | 0.32834979 | 3.82581975 | 12.1084 | 0.0998 | 0.7528 |
| Games/simulations method | - 0.83373846 | - 9.65617388 | 11.6447 | 0.6876 | 0.4092 |
| Student sex | 0.03451273 | 0.64817700 | 2.0097 | 0.1040 | 0.7478 |
| Student IQ | 0.25130893 | 0.15552701 | 0.0835 | 3.4723 | 0.0657 |
| Student--MDP | 0.04288083 | 1.97532775 | 5.0721 | 0.1517 | 0.6979 |
| Socioeconomic status | 0.02735574 | 0.01585012 | 0.0680 | 0.0544 | 0.8161 |
| Attitudes to mathematics pretest | 0.08489889 | 0.09529546 | 0.1480 | 0.4146 | 0.5213 |
| Pretest--MDP | 0.31524863 | 5.90209330 | 9.3897 | 0.3951 | 0.5312 |
| Attitudes to economics pretest | - 0.03002423 | - 0.02991058 | 0.1213 | 0.0608 | 0.8058 |
| Mathematics pretest | 0.07994984 | 0.13546518 | 0.2469 | 0.3010 | 0.5846 |

TABLE XXIX--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | - 0.14832480 | - 2.77694096 | 8.5752 | 0.1049 | 0.7468 |
| Economics pretest | - 0.04420659 | - 0.13410304 | 0.4466 | 0.0902 | 0.7646 |
| Pretest--MDP | - 0.19307848 | - 3.61751304 | 9.4272 | 0.1472 | 0.7021 |
| Interaction of IQ and lecture | - 0.22362538 | - 0.02703807 | 0.0953 | 0.0806 | 0.7772 |
| Interaction of IQ and games/simulations | 0.55233474 | 0.06682721 | 0.0950 | 0.4949 | 0.4836 |
| Interaction of sex and lecture | - 0.07364761 | - 0.51665515 | 2.7571 | 0.0351 | 0.8518 |
| Interaction of sex and games/ simulations | 0.36166663 | 2.62461685 | 2.6847 | 0.9557 | 0.3309 |
| Interaction of socio-economic status and lecture | 0.01549585 | 0.00368415 | 0.0990 | 0.0014 | 0.9704 |
| Interaction of socio-economic status and games/simulations | - 0.04174301 | - 0.00987610 | 0.0861 | 0.0131 | 0.9090 |

*Constant = 8.48932858

TABLE XXX

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF ECONOMICS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | 0.05187068 | 0.01471516 | 0.0304 | 0.2343 | 0.6296 |
| Lecture method | 0.22451193 | 3.55629995 | 12.4531 | 0.0816 | 0.7759 |
| Games/simulations method | - 0.46350264 | - 7.29791261 | 12.0938 | 0.3641 | 0.5478 |
| Student sex | 0.05812669 | 1.48409281 | 2.0612 | 0.5184 | 0.4735 |
| Student IQ | - 0.05843675 | - 0.04916490 | 0.0868 | 0.3209 | 0.5726 |
| Student IQ--MDP | 0.06456346 | 4.04328167 | 5.2425 | 0.5948 | 0.4427 |
| Socioeconomic status | - 0.01513268 | - 0.01191986 | 0.0705 | 0.0286 | 0.8662 |
| Attitudes to economics pretest | 0.07739293 | 0.10481546 | 0.1271 | 0.6801 | 0.4119 |
| Attitudes to mathematics pretest | 0.00626089 | 0.00955382 | 0.1524 | 0.0039 | 0.9502 |
| Pretest--MDP | - 0.84695114 | -21.55670703 | 9.8591 | 4.7807 | 0.0316 |
| Economics pretest | - 0.09320854 | - 0.38439574 | 0.4656 | 0.6815 | 0.4114 |

TABLE XXX--Continued

| Variable | Partial beta | Partial Absolute beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | 0.59605399 | 15.18214157 | 9.8702 | 2.3660 | 0.1278 |
| Mathematics pretest | 0.17021948 | 0.39209432 | 0.2687 | 2.1301 | 0.1481 |
| Pretest--MDP | 0.19942520 | 5.07579526 | 9.0483 | 0.3147 | 0.5763 |
| Interaction of IQ and lecture | - 0.19374544 | - 0.03184617 | 0.0981 | 0.1053 | 0.7464 |
| Interaction of IQ and games/simulations | 0.35337925 | 0.05812503 | 0.0975 | 0.3557 | 0.5525 |
| Interaction of sex and lecture | - 0.02151164 | - 0.20515720 | 2.8522 | 0.0052 | 0.9428 |
| Interaction of sex and games/ simulations | - 0.09978573 | - 0.98445785 | 2.7909 | 0.1244 | 0.7252 |
| Interaction of socio-economic status and lecture | 0.10760395 | 0.03477939 | 0.1024 | 0.1153 | 0.7350 |
| Interaction of socio-economic status and games/simulations | 0.28507776 | 0.09169300 | 0.0924 | 0.9850 | 0.3238 |

*Constant = -0.57369941

TABLE XXXI

REGRESSION COEFFICIENTS OF LONG-TERM RETENTION OF STUDENT ATTITUDES TOWARD THE DISCIPLINE OF MATHEMATICS (LECTURE AND GAMES AND SIMULATIONS)

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Teacher 3* | 0.03711028 | 0.00841209 | 0.0256 | 0.1079 | 0.7433 |
| Lecture method | 0.28391487 | 3.59346916 | 10.4791 | 0.1176 | 0.7325 |
| Games/simulations method | - 0.85863006 | -10.80237770 | 10.1327 | 1.1366 | 0.2894 |
| Student sex | 0.00174230 | 0.03554472 | 1.7402 | 0.0004 | 0.9838 |
| Student IQ | - 0.01906274 | - 0.01281507 | 0.0732 | 0.0307 | 0.8614 |
| Student IQ--MDP | 0.05050013 | 2.52700772 | 4.4194 | 0.3270 | 0.5690 |
| Socioeconomic status | - 0.05350255 | - 0.03367415 | 0.0593 | 0.3228 | 0.5714 |
| Attitudes to mathematics pretest | 0.05757096 | 0.07019589 | 0.1281 | 0.3004 | 0.5851 |
| Pretest--MDP | 1.08459729 | 22.05765831 | 8.1844 | 7.2634 | 0.0085 |
| Attitudes to economics pretest | 0.13100265 | 0.14176562 | 0.1063 | 1.7790 | 0.1859 |
| Mathematics pretest | - 0.09892345 | - 0.18207377 | 0.2281 | 0.6372 | 0.4270 |

TABLE XXXI--Continued

| Variable | Partial beta | Partial Absolute Beta | Standard Error | F | P |
|---|---|---|---|---|---|
| Pretest--MDP | - 0.28081340 | - 5.71095465 | 7.6044 | 0.5640 | 0.4547 |
| Economics pretest | 0.09366780 | 0.30865972 | 0.3920 | 0.6199 | 0.4333 |
| Pretest--MDP | - 0.67972953 | -13.83408394 | 8.2873 | 2.7866 | 0.0988 |
| Interaction of IQ and lecture | 0.02493298 | 0.00327466 | 0.0826 | 0.0016 | 0.9685 |
| Interaction of IQ and games/simulations | 0.28322617 | 0.03722394 | 0.0821 | 0.2056 | 0.6514 |
| Interaction of sex and lecture | - 0.16205703 | - 1.23494608 | 2.3969 | 0.2655 | 0.6077 |
| Interaction of sex and games/ simulations | 0.06807079 | 0.53660695 | 2.3500 | 0.0521 | 0.8199 |
| Interaction of socio-economic status and lecture | - 0.07611913 | - 0.01965868 | 0.0862 | 0.0520 | 0.8202 |
| Interaction of socio-economic status and games/simulations | 0.48256998 | 0.12402236 | 0.0770 | 2.5919 | 0.1112 |

*Constant = 2.35145932

# APPENDIX B

# Price Index:
# The Impact of Its Fluctuations on Real Income

Developed by

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Kathy Helwick
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Annie Mitchell
Kelly Walraven

# Price Index:
# The Impact of Its Fluctuations on Real Income

RATIONALE:

Students realize that the present is a price inflationary period, and they are able to measure the impact of fluctuations in prices mainly through the limited scope of their individual purchases as consumers. They have little or no knowledge of the use of indices to compare changes in such things as price, production, or earnings. As literate members functioning in an economic society, students need to understand how a price index is constructed and how it reflects the general trends in the price level of consumer goods and services so that they can determine for themselves the effects of the trends on their income.

TERMINAL BEHAVIORAL OBJECTIVES:

After participating in the activities and strategies of this module, the student will be able

1. to identify the Consumer Price Index as the main device for measuring changes in general price level trends of consumer goods and services,
2. to identify the Bureau of Labor Statistics as the main agency for compiling the data for computation of the Consumer Price Index,
3. to construct a two-axis line graph of price index versus time, given the price index for each year,
4. to construct a one-item index, given the base period data and the current data,
5. to construct a three-item index, given the base period data and the current data, and
6. to calculate the percentage of change in the Consumer Price Index with respect to the base period.

MINIMAL COGNITIVE CONTENT:

In order to fulfill the terminal behavioral objectives, the student should be able

1. to state in his own words how changes in prices have affected his own purchasing power in recent years,
2. to name coordinates of points on a two-axis line graph,
3. to determine whether price level has increased or decreased over a period of time, given a line graph of price index,
4. to compute the price index of an item during any year, given the base price and price for each year,
5. to solve equations of the form ax = b, and
6. to compute the arithmetic mean for a series of whole numbers.

TACTICS:

During their participation in the module, students will be engaged in a variety of activities. The module has been written so that it can be taught using either the lecture-demonstration method or a method which has as its major thrust games and simulations.

LECTURE-DEMONSTRATION METHOD

| Enabling Objectives | Activities | Resources |
|---|---|---|
| The student will be able to cite personal examples of decreased purchasing power. | Bring five items to class and display them. Examples: 45 rpm record, Bic ballpoint pen, soda pop bottle, ream of standard notebook paper.<br><br>Make a two-column chart on the board. Entitle columns "Current Prices" and "1970 Prices." Have the students estimate the current and past prices.<br><br>Question: What is the general trend in price?<br><br>Total the prices in each column.<br><br>Question: Could you purchase the same five items if you were given the total amount of the 1970 prices?<br><br>Make a list of items suggested by the students of things for which they have noticed an increase in price.<br><br>Question: Have the prices of any of these items doubled? tripled? increased by one-half? by one-fourth? Does anyone know an accurate fractional increase in the price of these items when considered as a "market basket" of items? | The students' own experience. |

Use a device to measure the amount of change. This is called an index. An index can measure change in production, earnings, or price. The price index measures increases or decreases in prices with respect to a base year. In the previous example 1970 was the base year.

Put the following chart on the board:

| | Price Index | Item Price |
|---|---|---|
| 1970 | 100 | |
| 1971 | 104 | |
| 1972 | 111 | |
| 1973 | 120 | |

Point out that one always assigns the number 100 to the price index of the base year.

The numbers in the first column actually say, "If an item costs $100 in 1970, then it would cost $104 in 1971, $111 in 1972, $120 in 1973." (Fill in the first "Item Price" column with those respective numbers.)

Question: If the item originally cost $100 in 1970, how many dollars did the item increase in price each year?

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Make another column entitled "Item Price." Let the base price be $1.00. | |
| | Have the students help fill in the prices for successive years. | |
| The student will be able to compute the price of an item, given the base period price and the new price index. | Repeat this activity for an Item Price in 1970 = $200, $400, $90. | |
| | Have the students name items whose current prices approach those in the chart. | The students' own experiences. |
| | At the top of the chart add the information that the price index in 1969 was 90. For each Item Price, fill in the 1969 price with the help of the students. | |
| | Have the students work the problems and answer the questions on the accompanying worksheet. | Worksheet 1 |
| | When the students have completed the exercise, check answers. | |

| Enabling Objectives | Activities | Resources |
| --- | --- | --- |
| | Refer to the chart on worksheet No. 1 for the following discussion:<br><br>Lead the students to the generalization that<br><br>$\frac{\text{base price}}{100}$ x price index = new price<br><br>by using examples:<br><br>$\frac{200}{100}$ x 96 = 192<br><br>Point out that this is the same procedure the students used to fill in the chart.<br><br>From the students' knowledge of equations, they should understand that, if one knows the value of any two of the three variables in the equation above, he should be able to compute the value of the third. | Teacher resources:<br><br>The Economic Problem (3rd edition), Robert L. Heilbroner, Prentice-Hall, Inc., pp. 207-210.<br><br>"The Consumer Price Index, a Short Description, 1971," U. S. Department of Labor, Bureau of Labor Statistics, pp. 1-2. |
| The student will be able to find the price index for a one-item sample. | Work the following examples for the class:<br><br>1) Given base price = $2<br>new price = $4,<br>find the index for the new price | |

$\frac{\text{base price}}{100}$ x price index = new price

$\frac{2}{100}$ x X = 4

Solving, we get X = 200

2) Year 1 price = $15
Year 2 price = $20
Find the price index for Year 2.

$\frac{15}{100}$ x X = 20

Solving, one gets X = 133-1/3

3) Year 1 price = $2
Year 2 price = $5
Year 3 price - $3
Find the price index for Years 2 and 3.
The two equations to solve are the following:

$\frac{2}{100}$ x X = 5 $\frac{2}{100}$ x Y = 3

Solving, one gets X = 250 and Y = 150

Assign the completion of the companion worksheet. Worksheet 2

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | When completed, check answers and discuss those with which the students had difficulty. | |
| The student will learn to compute the price index for an aggregate of items. | Work the following example for the class: | |

| | Year 1 | Year 2 |
|---|---|---|
| eggs (each) | 5¢ | 6¢ |
| hamburger (per lb.) | 40¢ | 50¢ |
| apples (each) | 10¢ | 12¢ |

Step 1: Find the total cost of the items in Year 1. This corresponds to the base price.

Step 2: Find the total cost of the items in Year 2. This corresponds to the new price.

Step 3: Plug these values into the formula for finding the price index.

$$\frac{55}{100} \times X = 68$$

Solving, one gets X = 123-7/11, the new price index.

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Work the following example for the class:<br><br>Solving for the new price index, one gets X = 140.<br><br>Have the students complete the accompanying worksheet.<br><br>Check the answers when completed. | Worksheet 3 |
| The student will be able to compile a multi-item price index using averaging. | Have a collection of newspapers containing grocery advertisements (at least one paper for each week of the past six months).<br>Distribute one paper and one copy of the chart to each student.<br>Working individually, the student will find as many of the asked-for prices as possible, compute the average price of each item, and find the total of those averages.<br><br>On the blackboard or overhead projector, draw a cumulative chart like the one below for compiling the data. | Issues of the Dallas Times Herald or Dallas Morning News |

| | Year 1 | Year 2 |
|---|---|---|
| suit | $70 | $95 |
| shoes | 20 | 28 |
| shirt | 5 | 10 |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Month Average Price of Market Basket<br>1<br>2<br>3<br>4<br>5<br>6<br><br>Have the students compute the price index for each month, assuming the base month is Month 1. | |
| The student will become aware that the Consumer Price Index, as calculated by the Bureau of Labor Statistics, is the main device for measuring changes in the general level of prices. | Lecture to the students for approximately 15 minutes about the history of the Consumer Price Index.<br><br>Points of emphasis:<br>1. The length of time the B.L.S. has been calculating the Consumer Price Index.<br>2. Dates of revision of the CPI.<br>3. The cities used in the survey for revision of the CPI in 1960-61.<br><br>Give each student a copy of Handouts 1 and 2.<br>Help the students interpret it. | "The Consumer Price Index, a Short Description, 1971," U. S. Department of Labor, Bureau of Labor Statistics, pp. 3-9.<br><br>Handouts 1 and 2. |

| Enabling Objectives | Activities | Resources |
| --- | --- | --- |
| | Have a lecture and discussion period during which each student will receive a partial list of the 400 items in the market basket used by the Bureau of Labor Statistics.<br><br>Points of emphasis:<br>1. Definition of the market basket.<br>2. The types of items that make up the market basket.<br>3. The measurement of average price change. | Handout 3 |
| | Have a lecture and discussion regarding price data collection.<br><br>Points of emphasis:<br>1. The role of the professional shopper.<br>2. The reasons prices are collected. | |
| The student will be able to name three complexities that arise in the sampling process for computing a price index. | Questions for discussion:<br>1. Do you believe the Consumer Price Index is an exact measurement of price change?<br>2. If not, how accurate do you think it is?<br>3. How much trouble do you think it is to conduct such a survey? | "The Consumer Price Index, a Short Description, 1971," U. S. Department of Labor, Bureau of Labor Statistics, p. 5. |

| Enabling Objectives | Activities | Resources |
|---|---|---|

Take a survey of the class by a sampling procedure.

The problem will be to calculate the average weight of a member of the class.

Take a sample of five students. Ask them their weights. Find the average weight.

Test the accuracy of the average by determining the weights of all the people in the class. (Have each student write his weight on a piece of paper, which is then passed to the front). From that information have the class find the true average weight.

How close was the sample average to the class average?

What things account for the difference?
(Try to solicit the following:
not a large enough sampling,
the students chosen were not representative, and
the students in the sample did not give their true weights)

Take a survey to determine the average height of the class. Follow the procedure outlined above.

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | After the experiment has been completed, measure the heights of all students in the class.<br><br>The conclusions that were drawn by the class, with respect to the sampling procedure, are similar to the problems encountered by the Bureau of Labor Statistics when its shoppers collect a sample and the price index is computed. | |
| The student will begin to understand why the CPI may not be accurate for all areas of the country and for all households. | These problems were encountered by the sampling procedure:<br>1. Not a large enough sample.<br>2. False information.<br>3. Difference in family needs for different products.<br>4. Difference in the quality of items. | |
| The student will be able to apply what he already knows about the effects of fluctuations in the price index to actual situations. | Distribute a copy of Budget A to each student.<br><br>Budget A will be used by the instructor as an example of what is expected of the student when completing Budgets B and C. | Worksheet 5 |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Budget A: This breakdown of expenses shows how a Sears' department head spent his salary of $8562 last year. For each category the monthly allotment as well as the yearly total is given. Suppose that the Consumer Price Index increases 5% in the following year and the man's income remains the same.<br><br>Question: What will happen to the man's purchasing power? Has it increased or decreased?<br><br>Since each of the items listed will cost more for the same quantity and quality (except for the items marked with an *), he will not be able to buy the same items in the same quantity or quality. He will have to redistribute his income among the categories listed. | |
| The student will be able to compute the new prices of items, given the previous price and the percent of increase. | Examine what the new prices will be for each category after the 5% increase.<br><br>Example: Food per year = $1080<br>To find the price after the increase, first find the amount of increase by solving the following equation:<br><br>$\frac{5}{100} = \frac{X}{1080}$ where X = the amount of increase | |

Solving, one gets X = 54. This means the man will have to spend an additional $54 this year in order to duplicate the quantity and quality of food purchased during the previous year.

Question: How much will he have to spend altogether on food next year if he wants to purchase the same things as last year? ($1134)

Enter those amounts in the appropriate columns of Budget A.

Repeat the above process for the following categories: "Housing," "Transportation," and "Utilities." Let the students help do the calculations for the remaining categories.

Question: What would the man's yearly salary have to be this year in order to afford the same items he purchased last year? (Find Total 2.)

Since the man's salary is constant, he will have to cut back spending in some or all of the categories.

Question: By how much will he have to cut his expenses? (Find the difference between Total 1 and Total 2.)

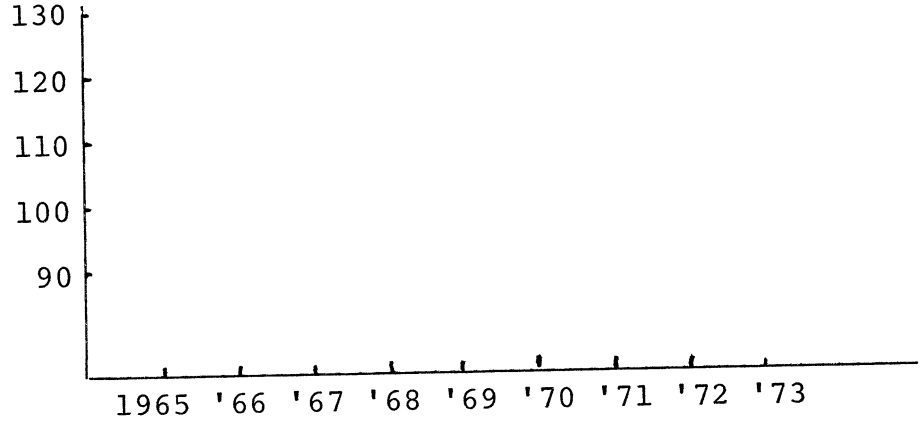
| Enabling Objectives | Activities | Resources |
|---|---|---|
| | In order to make out a revised budget, one must consider certain limitations. These minimum amounts are listed in the column at the far right. Also, the items marked with an * are fixed expenditures unless the owner decides to sell them. | |
| | Question: When the budget is revised, what must the total of the expenses be? ($8562) | |
| | Have the students help determine how the expenditures should be redistributed. | |
| | Question: Now that some of these areas have had expenditures limited, in what ways would this man cut down on spending in order to live within the new budget? | The students' own experiences as a shopper and as a consumer. |
| | After this procedure has been completed for Budget A, give each student a copy of Budgets B and C. Have the students complete them according to the instructions given. | Worksheets 6 and 7. |

Worksheet 1

| Year | Price Index | Price of a potato peeler | Price of a car wash and wax | Price of a deluxe air conditioner |
|---|---|---|---|---|
| 1965 | 85 | | | |
| 1966 | 90 | | | |
| 1967 | 95 | | | |
| 1968 | 96 | | | |
| 1969 | 98 | | | |
| 1970 | 100 | $1.00 | $5.00 | $200 |
| 1971 | 110 | | | |
| 1972 | 115 | | | |
| 1973 | 130 | | | |

1. Fill in the missing prices in the chart.

2. From the first two columns, plot the price index and year on the axes below. Connect the points with line segments.




3. What is the base year in the chart above?

4. In what years did the price index increase? In what years did the price of the items increase?

Worksheet 1--Continued

5. If a price goes above the base price, is the price index greater or less than 100?

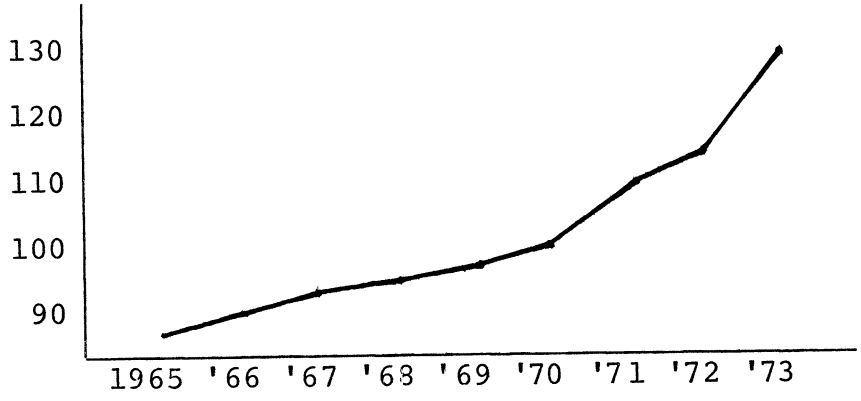
6. If a price goes below the base period, is the price index greater or less than 100?

Worksheet 1

Answer Key

| Year | Price Index | Price of a potato peeler | Price of a car wash and wax | Price of a deluxe air conditioner |
|---|---|---|---|---|
| 1965 | 85 | $ .85 | $4.25 | $170 |
| 1966 | 90 | .90 | 4.50 | 180 |
| 1967 | 95 | .95 | 4.75 | 190 |
| 1968 | 96 | .96 | 4.80 | 192 |
| 1969 | 98 | .98 | 4.90 | 196 |
| 1970 | 100 | 1.00 | 5.00 | 200 |
| 1971 | 110 | 1.10 | 5.50 | 220 |
| 1972 | 115 | 1.15 | 5.75 | 230 |
| 1973 | 130 | 1.30 | 6.50 | 260 |

2.




3. 1970

4. All years; all years

5. The price index is greater than 100.

6. The price index is less than 100.

# Worksheet 2

Solve for X:

1. $\frac{2}{100} \times X = 5$
2. $\frac{3}{100} \times X = 21$
3. $\frac{10}{100} \times X = 50$
4. $\frac{5}{100} \times X = 5.50$
5. $\frac{1}{100} \times X = 1.10$
6. $\frac{2}{100} \times X = 2.50$
7. $\frac{3}{100} \times X = 3.30$
8. $\frac{20}{100} \times X = 25$
9. $\frac{1}{100} \times X = 1.25$
10. $\frac{2}{100} \times X = 1.40$

Find the missing price indices in the chart below using the formula:

$$\frac{\text{base price}}{100} \times \text{price index} = \text{new price}$$

| Year | Price | Price index |
|---|---|---|
| 1967 | $2.00 | 100 |
| 1968 | 1.50 | |
| 1969 | 1.75 | |
| 1970 | 2.20 | |
| 1971 | 2.50 | |
| 1972 | 2.80 | |

Worksheet 2

Answer Key

1. 250
2. 700
3. 500
4. 110
5. 110
6. 125
7. 110
8. 125
9. 125
10. 70

| Year | Price | Price Index |
|---|---|---|
| 1967 | $2.00 | 100 |
| 1968 | 1.50 | 75 |
| 1969 | 1.75 | 87.5 |
| 1970 | 2.20 | 110 |
| 1971 | 2.50 | 125 |
| 1972 | 2.80 | 140 |

## Worksheet 3

### COMPUTING THE PRICE INDEX FOR MORE THAN ONE ITEM

Before working the exercises below, study the following steps carefully.

EXAMPLE: Given the following price data, compute the price index for Year 2. (Assume that Year 1 is the base year.)

| | Year 1 | Year 2 |
|---|---|---|
| TV (black & white) | $ 80 | $ 88 |
| Stereo | 100 | 112 |

Steps to solve:

1. Total the prices for Year 1 = $180 = base price
2. Total the prices for Year 2 = $200 = new price
3. Substitute into the formula and solve.

$$\frac{\text{base price}}{100} \times \text{price index} = \text{new price}$$

$$\frac{180}{100} \times X = 200$$

Solving, one gets X = 111-1/9 = price index for Year 2.

With the data below, compute the price index for Year 2 assuming Year 1 is the base year.

1.

| | Year 1 | Year 2 |
|---|---|---|
| car tire | $20 | $25 |
| bike tire | 2 | 3 |

2.

| | Year 1 | Year 2 |
|---|---|---|
| office visit to physician | $10 | $12 |
| shot | 5 | 6 |

Worksheet 3--Continued

3.

| | Year 1 | Year 2 |
|---|---|---|
| knit shirt | $1.25 | $1.75 |
| socks | .40 | .45 |
| tennis shoes | 2.00 | 2.25 |

4.

| | Year 1 | Year 2 |
|---|---|---|
| transistor radio | $15.00 | $ 3.00 |
| hose | 1.00 | .50 |
| alarm clock | 10.00 | 3.00 |
| record player | 25.00 | 12.00 |

5.

| | Year 1 | Year 2 |
|---|---|---|
| box of salt | $.10 | $.11 |
| hamburger meat | .33 | .59 |
| lettuce | .29 | .49 |

6.

| | Year 1 | Year 2 |
|---|---|---|
| circus tickets | $1.50 | $1.75 |
| fair expenses | 3.00 | 5.00 |
| zoo | -- | .50 |
| movie | .35 | .75 |

# Worksheet 3

## Answer Key

1. 127.27 or 127-3/11
2. 120
3. 121.91780... or 121-67/73
4. 36.274901... or 36-14/51
5. 165.27 or 165-5/18
6. 164.948556... or 164-92/97

Worksheet 4

Look through the newspaper you have to complete the chart below. Use only the prices from the following stores: Safeway, Tom Thumb, A & P, Kroger, and Piggly Wiggly. For each item try to find a price from each store.

After you have found as many prices as possible, compute the average price for each item. Enter this number in the appropriate blank.

Find the total of the average prices. Put this number in the blank at the lower right.

| | Safeway | Tom Thumb | A & P | Kroger | PW | Average |
|---|---|---|---|---|---|---|
| White sugar - 5 lbs. | | | | | | |
| Red potatoes - 5 lbs. | | | | | | |
| Bacon - 1 lb. | | | | | | |
| Chicken - 1 lb. | | | | | | |
| Hamburger - 1 lb. | | | | | | |
| Tuna fish - 6½oz. | | | | | | |
| Hotdogs - 12 oz. | | | | | | |
| Canned corn - #303 can | | | | | | |
| Coffee (canned) 1 lb. | | | | | | |
| Canned peaches - #303 can | | | | | | |

Month _____ Total _____

Handout 1

| CITY AND SIZE STRATUM | POPULATION WEIGHT [1] | PRICING SCHEDULE [2] | | | | | |
|---|---|---|---|---|---|---|---|
| | | FOOD [3] | OTHER ITEMS | | | | |
| | | | SAMPLES | SCHEDULE [3] | | | |
| | | | | M | 1 | 2 | 3 |
| A. Standard Metropolitan Statistical Areas of 1,400,000 or more in 1960: | | | | | | | |
| *Baltimore, Md | 1.402 | | 1A,2B | | | | x |
| *Boston, Mass | 1.930 | | 1A,2B | | x | | |
| *Chicago-Northwestern Indiana [4] | 5.552 | | 1A,1B,2A,2B | x | | | |
| *Cleveland, Ohio | 1.325 | | 1A,2B | | | x | |
| *Detroit, Mich | 2.895 | | 1A,2B | x | | | |
| *Los Angeles-Long Beach, Calif | 5.017 | | 1A,2B | x | | | |
| *New York-Northeastern New Jersey [4] | 12.577 | 1A,1B,2A,2B | 1A,2B | x | | | |
| *Philadelphia, Pa | 2.703 | | 1A,2B | x | | | |
| *Pittsburgh, Pa | 1.565 | | 1A,2B | | x | | |
| *St. Louis, Mo | 1.428 | | 1A,2B | | | | x |
| *San Francisco-Oakland, Calif | 2.372 | | 1A,1B,2A,2B | | | | x |
| *Washington, D. C | 1.255 | | 1A,1B,2A,2B | | | x | |
| B. Standard Metropolitan Statistical Areas of 250,000 to 1,399,999 in 1960: [5] | | | | | | | |
| *Atlanta, Ga | 2.934 | | 1A,2B | | | | x |
| *Buffalo, N.Y | 2.347 | | 1A,2B | | | x | |
| *Cincinnati, Ohio-Ky | .740 | | 1A,2B | | | | x |
| *Dallas, Tex | 2.934 | | 1A,2B | | | x | |
| Dayton, Ohio | 1.096 | | 1A,2B | | | x | |
| Denver, Colo | 1.838 | | 1A,2B | | x | | |
| Hartford, Conn | 2.348 | | 1 | | | | x |
| *Honolulu, Hawaii | .354 | | 1A,2B | | | | x |
| *Houston, Tex | .999 | 1A,2B | 1A,2B | | x | | |
| Indianapolis, Ind | 1.095 | | 2 | | | | x |
| *Kansas City, Mo.-Kans | .710 | | 1A,2B | | | | x |
| *Milwaukee, Wis | .850 | | 1A,2B | | | x | |
| *Minneapolis-St. Paul, Minn | 1.042 | | 1A,2B | | x | | |
| Nashville, Tenn | 2.933 | | 2 | | x | | |
| *San Diego, Calif | .672 | | 1A,2B | | | x | |
| *Seattle, Wash | 1.837 | | 1A,2B | | | x | |
| Wichita, Kans | 1.096 | | 1A,2B | | x | | |
| C. Standard Metropolitan Statistical Areas of 50,000 to 249,999 in 1960: | | | | | | | |
| Austin, Tex | 1.250 | 1 | 1 | | x | | |
| Bakersfield, Calif | 1.323 | 2 | 2 | | | | x |
| Baton Rouge, La | 1.250 | 2 | 2 | | | x | |
| Cedar Rapids, Iowa | 1.284 | 1A,2B | 1A,2B | | x | | |
| Champaign-Urbana, Ill | 1.284 | 1A,2B | 1A,2B | | x | | |

## Handout 1--Continued

| CITY AND SIZE STRATUM | POPULATION WEIGHT[1] | PRICING SCHEDULE[2] | | | | | |
|---|---|---|---|---|---|---|---|
| | | FOOD[3] | OTHER ITEMS | | | | |
| | | | SAMPLES | SCHEDULE[3] | | | |
| | | | | M | 1 | 2 | 3 |
| Durham, N.C | 1.250 | 1A,2B | 1A,2B | | | | x |
| Green Bay, Wis | 1.284 | 1 | 1 | | | x | |
| Lancaster, Pa | 1.803 | 1 | 1 | | x | | |
| Orlando, Fla | 1.250 | 1A,2B | 1A,2B | | | | x |
| Portland, Maine | 1.803 | 2 | 2 | | | x | |
| D. Urban Places of 2,500 to 49,999 in 1960: | | | | | | | |
| Anchorage, Alaska | .065 | 1,2 | 1,2 | | x | | |
| Crookston, Minn | 1.352 | 1 | 1 | | | | x |
| Devils Lake, N. Dak | 1.352 | 2 | 2 | | | | x |
| Findlay, Ohio | 1.352 | 1 | 1 | | | x | |
| Florence, Ala | 1.227 | 1 | 1 | | x | | |
| Kingston, N.Y | 1.171 | 2 | 2 | | | | x |
| Klamath Falls, Oreg | 1.338 | 1 | 1 | | | x | |
| Logansport, Ind | 1.352 | 2 | 2 | | x | | |
| Mangum, Okla | 1.226 | 1 | 1 | | | | x |
| Martinsville, Va | 1.227 | 2 | 2 | | | x | |
| McAllen, Tex | 1.227 | 2 | 2 | | | | x |
| Millville, N.J | 1.171 | 2 | 2 | | | x | |
| Niles, Mich | 1.351 | 1 | 1 | | x | | |
| Orem, Utah | 1.339 | 2 | 2 | | x | | |
| Southbridge, Mass | 1.170 | 1 | 1 | | | x | |
| Union, S.C | 1.227 | 1 | 1 | | | x | |
| Vicksburg, Miss | 1.226 | 2 | 2 | | x | | |

*Indicates areas for which separate indexes are published.

[1]The 18 largest Standard Metropolitan Statistical Areas as defined for the 1960 Census of Population were selected on a certainty basis and represent themselves only in the population weight patterns. The other sample selections carry not only their own population weights but also prorata shares of the population weights of all cities in their region in the same population class.

[2]Item samples are identified as samples "1" and "2." Outlet samples are identified as samples "A" and "B." The determination as to the extent of sampling within an area depended on plans for publishing separate area indexes and on plans for developing estimates of sampling error and its components.

[3]Foods, fuels, and several other items are priced every month in all cities. Prices of a few items are collected semiannually or annually in all cities. Prices of other goods and services are obtained on the schedule indicated:

M = Every month.
1 = January, April, July, and October.
2 = February, May, August, and November.
3 = March, June, September, and December.

[4]Standard Consolidated Areas.

[5]Population weights revised for this group beginning January 1966.

Handout 3

Consumer Price Index: Major Groups and Individual Items

A. Food

At home:

- cereals
- bakery products
- beef
- veal
- pork
- poultry
- milk, fresh (grocery)
- milk, fresh (delivered)
- butter
- apples
- bananas
- oranges
- lettuce
- tomatoes
- eggs
- margarine
- sugar
- coffee
- potatoes

Away from home:

- meals
- snacks

B. Housing

- rent
- mortgage interest
- maintenance
- coal
- telephone
- textile home furnishings
- floor coverings
- housekeeping supplies
- hotels and motels
- property taxes
- repairs
- gas
- water services
- bedroom furniture
- appliances
- baby sitter
- home purchasing
- property insurance
- fuel oil
- electricity
- sewage services
- upholstered sofas
- domestic services
- postal charges

C. Apparel and Upkeep

- men's suits
- street dresses
- street shoes
- boys' apparel
- nylon hose
- women's coats
- girls' apparel

Handout 3--Continued

D. Transportation

new automobiles
motor oil
auto maintenance
auto operator's permit
local transit fares
airplane fares
used automobiles
auto parts
auto insurance rates
parking fees
taxicab fares
bus fares
gasoline
auto repairs
auto registration
auto financing
railroad fares

E. Health and Recreation

drugs and prescriptions
eyeglasses
daily service charges
health insurance
beauty shop services
bowling fees
cigarettes
whiskey and wine
bank service charges
physician--house call
eye examination
hospital services
toilet goods
TV
newspapers
cigars
funeral services
physician--office call
dentists' fees
non-hospital services
men's haircuts
movie admissions
college tuition
beer
legal services

## Worksheet 5

### Budget A

Yearly Income: $8562 Position: Sears' Department Head

Description: This husband and wife are making payments on the mortgage of their three-bedroom, one-bath, one-car-garage home. Their 1968 Ford is completely paid for.

| Category | Monthly Expenses | Yearly Expenses | Amount of Increase | New Expenses | Revised Expenses | Minimum |
|---|---|---|---|---|---|---|
| Food | $90 | $1080 | | | | $ 960 |
| Housing* | 94 | 1128 | | | | 1128 |
| Transportation | | | | | | |
| Payment | .. | .... | | | | .... |
| Upkeep | 50 | 600 | | | | 420 |
| Taxes* | .. | 1693 | | | | 1693 |
| Utilities | 37 | 444 | | | | 360 |
| Sears | 45 | 540 | | | | 200 |
| Montgomery Wards | 40 | 480 | | | | 200 |
| Note to finance company | 42 | 504 | | | | 504 |
| Church pledge | 40 | 480 | | | | ... |
| Sears retirement | 25 | 300 | | | | 300 |
| Miscellaneous | .. | 713 | | | | ... |
| Medical and insurance | 50 | 600 | | | | 300 |
| | | Total 1 | | Total 2 | Total 3 | |

*This price will not change under the price increase.

Directions: After studying the data given for Budget A, find Total 1. Assume there is a 5% increase in prices. Calculate the amount each category would increase; then compute the new yearly expenses. Then revise the budget so that the salary of $8562 is spent. Compute Total 2 to determine how much the man would have to spend in the second year if he duplicated his purchases of the first year- Check your revised budget by finding Total 3. Should it be $8562?

Worksheet 5

Answer Key

| Category | Monthly Expenses | Yearly Expenses | Amount of Increase | New Expenses | Revised Expenses | Minimum |
|---|---|---|---|---|---|---|
| Food | $90 | $1080 | $54 | $1134 | | |
| Housing* | 94 | 1128 | .. | 1128 | | |
| Transportation Payment | .. | .... | .. | .... | | |
| Upkeep | 50 | 600 | 30 | 630 | | |
| Taxes* | .. | 1693 | .. | 1693 | | |
| Utilities | 37 | 444 | 22.50 | 466.20 | | |
| Sears | 45 | 540 | 27 | 567 | | |
| Montgomery Wards | 40 | 480 | 24 | 504 | | |
| Note to finance company | 42 | 504 | 25.20 | 529.20 | | |
| Church pledge | 40 | 480 | 24 | 504 | | |
| Sears retirement | 25 | 300 | 15 | 315 | | |
| Miscellaneous | .. | 713 | 35.65 | 748.65 | | |
| Medical and insurance | 50 | 600 | 30 | 630 | | |
| | | Total 1 $8562 | | Total 2 $8849.05 | | |

Worksheet 6

Budget B

Yearly Income: $7022 Position: Coca Cola Route Salesman

Description: This family of three (husband, wife, and small infant) rents a two-bedroom house. They are in the process of purchasing a second-hand 1965 Dodge.

| Category | Monthly Expenses | Yearly Expenses | Amount of Increase | New Expenses | Revised Expenses | Minimum |
|---|---|---|---|---|---|---|
| Food | $110 | $1320 | | | | $1080 |
| Housing | 95 | 1140 | | | | 1140 |
| Transportation | | | | | | |
| Payment* | 45 | 540 | | | | 540 |
| Upkeep | 40 | 480 | | | | 360 |
| Bus* | 15 | 180 | | | | 180 |
| Taxes* | ... | 986 | | | | 986 |
| Utilities | 35 | 420 | | | | 360 |
| Penney's | 30 | 360 | | | | 200 |
| Levines | 38 | 456 | | | | 300 |
| Note to bank* | 27 | 324 | | | | 324 |
| Church pledge | 20 | 240 | | | | ... |
| Medical and insurance | 48 | 576 | | | | 240 |
| Miscellaneous | ... | .... | | | | .... |
| | | Total 1 | | Total 2 | Total 3 | |

*This price is fixed and will not change under the price increase.

Follow the directions at the bottom of Budget A to complete the chart above. For this budget the price increase will be 10%.

Worksheet 6

Answer Key

| Category | Monthly Expenses | Yearly Expenses | Amount of Increase | New Expenses | Revised Expenses | Minimum |
|---|---|---|---|---|---|---|
| Food | $110 | $1320 | $132 | $1452 | | |
| Housing | 95 | 1140 | 114 | 1254 | | |
| Transportation | | | | | | |
| Payment* | 45 | 540 | ... | 540 | | |
| Upkeep | 40 | 480 | 48 | 528 | | |
| Bus* | 15 | 180 | ... | 180 | | |
| Taxes* | ... | 986 | ... | 986 | | |
| Utilities | 35 | 420 | 42 | 462 | | |
| Penney's | 30 | 360 | 36 | 396 | | |
| Levines | 38 | 456 | 45.60 | 501.60 | | |
| Note to bank* | 27 | 324 | ... | 324 | | |
| Church pledge | 20 | 240 | 24 | 264 | | |
| Medical & insurance | 48 | 576 | 57.60 | 633.60 | | |
| Miscellaneous | ... | .... | .... | ..... | | |
| | | Total 1 $7022 | | Total 2 $7521.20 | | |

Worksheet 7

Budget C

Yearly Income: $11,286 Position: Truck Driver

Description: This family of five (husband, wife and three children) rents an apartment. They are currently making payments on a 1970 pick-up and camper and are making payments on a 1972 car. Also they are paying for a recently bought color television set.

| Category | Monthly Expenses | Yearly Expenses | Amount of Increase | New Expenses | Revised Expenses | Minimum |
|---|---|---|---|---|---|---|
| Food | $200 | $2400 | | | | $1320 |
| Apartment rent | 220 | 2640 | | | | 2640 |
| Transportation | | | | | | |
| Car payment | 140 | 1680 | | | | 1680 |
| Camper | 65 | 780 | | | | 780 |
| Upkeep | 85 | 1020 | | | | 600 |
| Taxes* | ... | 1100 | | | | 1100 |
| Utilities | ... | .... | | | | .... |
| Sanger-Harris | 40 | 480 | | | | 300 |
| Sears | 20 | 240 | | | | 200 |
| TV payment* | 43 | 516 | | | | 516 |
| Church pledge | ... | .... | | | | .... |
| Medical & insurance | 35 | 430 | | | | 300 |
| | | Total 1 | | Total 2 | Total 3 | |
| | | _____ | | _____ | _____ | |

*This price is fixed and will not change under the price increase.

Follow the directions at the bottom of Budget A to complete the chart above. For this budget the price increase will be 5%.

## Worksheet 7

### Answer Key

| Category | Monthly Expenses | Yearly Expenses | Amount of Increase | New Expenses | Revised Expenses | Minimum |
|---|---|---|---|---|---|---|
| Food | $200 | $2400 | $120 | $2520 | | |
| Apartment rent | 220 | 2640 | 132 | 2772 | | |
| Transportation | | | | | | |
| Car payment | 140 | 1680 | 84 | 1764 | | |
| Camper | 65 | 780 | 39 | 819 | | |
| Upkeep | 85 | 1020 | 51 | 1071 | | |
| Taxes | ... | 1100 | ... | 1100 | | |
| Utilities | ... | .... | ... | .... | | |
| Sanger-Harris | 40 | 480 | 24 | 504 | | |
| Sears | 20 | 240 | 12 | 252 | | |
| TV payment | 43 | 516 | ... | 516 | | |
| Church pledge | ... | .... | ... | .... | | |
| Medical & insurance | 35 | 430 | 21.50 | 451.50 | | |
| | | Total 1 | | Total 2 | | |
| | | $11286 | | $11769.50 | | |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| The student will be able to recognize that, when a price increases, the quantity demanded decreases and, when the price decreases, the quantity demanded increases. | (Introduction to the laws of supply and demand)<br><br>DEMAND (the consumer)<br><br>Set up the following chart on the board. | |

| Number of students who would buy steak | Price of steak per pound |
|---|---|
| | $ .25 |
| | .50 |
| | 1.00 |
| | 1.50 |
| | 2.00 |
| | 2.50 |
| | 3.00 |
| | 3.50 |
| | 4.00 |

Tell the students that they each have $4.00 with which to purchase food for their meal to be prepared at home. One possible entree would be steak if it is desired and if the student has the money with which to purchase it.

Poll the students to see how many would be willing to buy the steak at each of the prices given in the chart. Record these outcomes in the chart.

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Plot the points on a two-axis graph with the price on the vertical scale and the quantity demanded on the horizontal scale. This graph will show exactly how many students would purchase the steak at each price.<br><br>Generalization: As the price increases, the quantity demanded decreases. As the price decreases, the quantity demanded increases. | |
| The student will be able to recognize that, when price increases, the quantity supplied increases and, when the price decreases, the quantity supplied decreases. | SUPPLY (the producer)<br><br>Suppose you are a cattle rancher who depends only on the sale of beef for your income.<br><br>Question: What factors determine your income? (the number of cattle, the selling price, the cost of feed, and so on)<br><br>Consider the following conditions:<br>1. The price at which you can sell your cattle is below the amount of money it takes to raise the cattle.<br><br>Would you make a profit by selling? Would you sell your cattle under those conditions? Why or why not? | |

2. The price at which you can sell your cattle is the same as the amount it takes to raise them.

Would you make a profit by selling? Would you sell your cattle under these conditions? Why or why not?

3. As the price at which you can sell your cattle increases, would you want to sell more or less cattle if the price exceeds the amount of money it takes to raise them? Why?

Put the following chart on the board and explain how these data correspond to the generalizations and answers to the preceding questions.

| Quantity Supplied | Selling Price per Pound |
|---|---|
| 0 | $ .25 |
| 100 | .50 |
| 150 | 1.00 |
| 300 | 1.50 |
| 350 | 2.00 |
| 500 | 2.50 |
| 700 | 3.00 |
| 1000 | 3.50 |
| 1500 | 4.00 |

Graph that information on two axes to make a supply curve. On the horizontal scale put the quantity supplied, and on the vertical scale put the price.

This graph shows exactly how many cattle will be supplied at each given price.

Generalization: As price increases, the quantity supplied increases; and, as the price decreases, the quantity supplied decreases.

Now the question arises, how is the market price of an item determined so that the supplier will get a profit and so that the consumer will purchase (demand) the item?

Put the following chart on the board.

| Price (kite) | Demand | Supply |
|---|---|---|
| $.05 | 100 | 0 |
| .10 | 75 | 5 |
| .15 | 50 | 10 |
| .20 | 40 | 20 |
| .25 | 30 | 30 |
| .30 | 25 | 35 |
| .40 | 10 | 70 |
| .45 | 5 | 90 |
| .50 | 1 | 125 |

Teacher Resource: "The Economic Problem," 3rd ed., Robert L. Heibroner, Prentice-Hall, Inc.; chart is revised form of the supply-demand schedule on p. 452.

Explain how these data correspond to the steak and cattle examples and the generalizations drawn from them.

Give an example to show how the chart is interpreted: At the price $.30 there is a demand for 25 kites. That is, 25 people are willing and able to buy them at that price. At that same price, the suppliers are willing and able to supply 35 kites and sell them at a profit.

Questions for discussion:

1. What do we mean when we say there is a demand for 75 kites if the selling price is $1.10?
2. What do we mean when we say there is a supply of 70 kites at the price $.40?
3. As the price of the kite increases, what trend does the demand follow? If you are the purchaser, does this seem reasonable? Why?
4. As the price of the kite decreases, what trend does the demand follow? If you are the purchaser, does this seem reasonable? Why?
5. As the price of the kite increases, what trend does the supply follow? If you are the supplier, does this seem reasonable? Why?

| Enabling Objectives | Activities | Resources |
|---|---|---|

6. As the price of the kite decreases, what trend does the supply follow? If you are the supplier, does this seem reasonable? Why?

Plot the information from the chart on a pair of axes. Let the horizontal scale represent the quantity and the vertical scale represent the price.

Question: What is the point of intersection of the demand and supply curves?

The student will be able to identify the equilibrium price, given the demand curve and the supply curve.

This point, P = $.25 and Q = 30, gives the market price of the item. The producer will supply 30 kites, and the consumer will purchase 30 kites. All kites that are produced will be sold.

Examine other possible prices on the graph to show why $.30 is the best possible price.

1. P = $.40, S = 70, D = 10
   Here more kites are produced than demanded. Not all of them will sell. If you were the producer with an oversupply, what would you do to "clear out" the merchandise? (lower the price)

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | 2. P = $.15, S = 10, D = 50<br>More kites are demanded than are produced. There is a shortage. If you were the producer, what would you do to eliminate the shortage? (produce more and raise the price) | |
| | Conclusion: If the price of an item is anything except the price at which S = D, there will be an oversupply or a shortage that needs to be alleviated. | |
| | Assign the completion of the accompanying worksheet. | Worksheet 8 |
| The student will be able to allocate his allowance so that the number of utility points is maximized. | "The Market," a simulation learning game.<br><br>Let the students divide into six-member teams. Appoint a recorder for each team. The recorder will keep the composite tally for the team. | Economic Decision Games, Erwin Rausch, Science Research Associates ("A Guide to Teaching"), ("Student Instructions") |
| | Distribute to each student a set of instructions and Handouts 4 and 5. | Handouts 4 and 5 |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Have the students read through the instructions orally in class, answering any questions that may arise regarding terminology, procedure, and so on. | |
| | Distribute to each recorder a copy of Handouts 6, 7, 8, 9 and 10. | Handouts 6, 7, 8, 9, and 10 |
| | Explain the Factsheet and Handouts 6, 7, 8, 9 and 10. | |
| | Play the sample game step by step. | |
| | Collect all papers at the end of class. | |
| | Return the papers to each team.<br>Begin the simulation.<br>Budgets assigned to the students:<br>First exercise $40<br>Second exercise 27<br>Third exercise 27<br>Fourth exercise 27<br>At the end of each day of play, collect all papers. | |

Copy the cumulative scoresheet on the board.
Fill it in after the simulation has been completed.

Concluding discussion of the simulation, examine the data from the simulation.

Which product had the most demand in the first exercise? in the second? in the third? in the fourth? over-all?

Questions for class discussion:

1. Did the demand for books increase or decrease as the game progressed? Why?
2. Did the demand for records increase or decrease as the game progressed? Why?
3. Did the demand for sweaters increase or decrease as the game progressed? Why?

Examine Handout 8, the supply curve for sweaters, for the second, third, and fourth exercises. Put the following chart on the board:

| | Second | Third | Fourth |
|---|---|---|---|
| Sweaters (1000) | $ 3.55 | $4.40 | $2.95 |
| Total outlay | 3550 | 4400 | 2950 |
| Price index | 100 | | |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Fill in the chart using the unit prices from Handout 8. Compute the total outlay for each exercise.<br><br>Questions:<br>4. What was the trend in unit prices?<br>5. What was the trend in total outlay?<br>6. Suppose you had $3600. During which exercises could you have purchased sweaters (1000)?<br>7. When the price of sweaters was raised in the third exercise, what happened to your ability to purchase that item?<br>8. How does this relate to prices in the stores at which you shop? Are the prices rising or falling?<br>9. When the price of sweaters was lowered in the fourth exercise, what happened to your ability to purchase that item? | The students' own experiences. |
| The student will be able to evaluate purchasing power in the simulation and in his role as a consumer. | | |
| The student will be able to compute a one-item index. | Since the total outlay for sweaters (1000) has changed during the three exercises, we will use a price index to measure the changes that have occurred. The second exercise was the initial period for which we recorded the data; so we will refer to it as the base period. It will be assigned the index 100. To compute the price index for the third exercise, we will use the data in the chart and the formula: | |

$$\frac{\text{base price}}{100} \times \text{price index} = \text{new price}$$

For the third exercise:
base price = $3550
new price = $4400
price index for the third exercise = X

$$\frac{3550}{100} \times X = 4400$$

Solving, one gets X = 83-7/71 (Enter that number on the chart.)

This information means that, if you spent $100 in the second exercise, you would have to spend almost $124 in the third exercise to get the same number of sweaters.

For the fourth exercise:
base price = $3550
new price = $2950
price index = X

$$\frac{3550}{100} \times X = 2950$$

Solving, one gets X = 83-7/71 (Enter this number in the chart.)

This means that, if you spent $100 in the second exercise, you would only have to spend about $84 in the fourth exercise to get the same number of sweaters.

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | For additional drill work on index interpretation make an overhead plate from Overhead Transparency Plate 1 and let the students help fill it in. | Overhead Transparency Plate 1. |
| | Make a line graph on two axes using price index versus the three rounds using the information from above. Let price index be on the vertical scale and the round number on the horizontal scale. | |
| | Assign the completion of the companion worksheet. | Worksheet 1 (Lecture-demonstration) |
| | Follow the Lecture-demonstration method for the lessons marked with an "*". | Lecture-demonstration method section of the module. |
| The student will be able to allocate his income in order to maximize the number of utility points earned. | "Consumer," a learning simulation game<br><br>A modified version of the game will be used; the Credit Managers will be provided an expanded form of the interest schedules to include loans up to $200, and the Consumers will not be allowed to retire a loan before its "due date." | "Consumer," published by Western Publishing Co., developed by Academic Games Associates, Gerald Zaltman. |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Roles to be assigned or volunteered for:<br>Credit Managers<br>Banker, Department Store Manager, Finance Company Manager<br>Salesmen (2)<br>Coordinator (2), teacher and a student<br>Consumers (all the other students)<br><br>Distribute to each Consumer the consumer rules, profile, product catalog, and record sheet.<br><br>Distribute to each Credit Manager, Salesman, and Coordinator the respective profiles and tally sheets.<br><br>Go over the rules, the object of the game, profiles, and the forms with all the students.<br><br>Go over the individual profiels with the Credit Managers, Salesmen, and Coordinator.<br><br>Collect all papers at the end of the period. | |

| Enabling Objectives | Activities | Resources |
|---|---|---|
| | Begin the simulation and continue play for two and a half class periods.<br><br>Total the utility points for the Consumers to determine the winner.<br><br>Total the utility points for the Credit Managers to determine the winner in that bracket. | |
| | Use the questions in the manual accompanying the simulation for the concluding discussion of the exercise. | |

Worksheet 8

SUPPLY AND DEMAND

Given the data below, construct a demand curve and a supply curve on the same set of axes.

| Price of wheat per bushel | Demand (Number of bushels) | Supply (Number of bushels) |
|---|---|---|
| $5 | 9 | 18 |
| 4 | 10 | 16 |
| 3 | 12 | 12 |
| 2 | 15 | 7 |
| 1 | 20 | 0 |

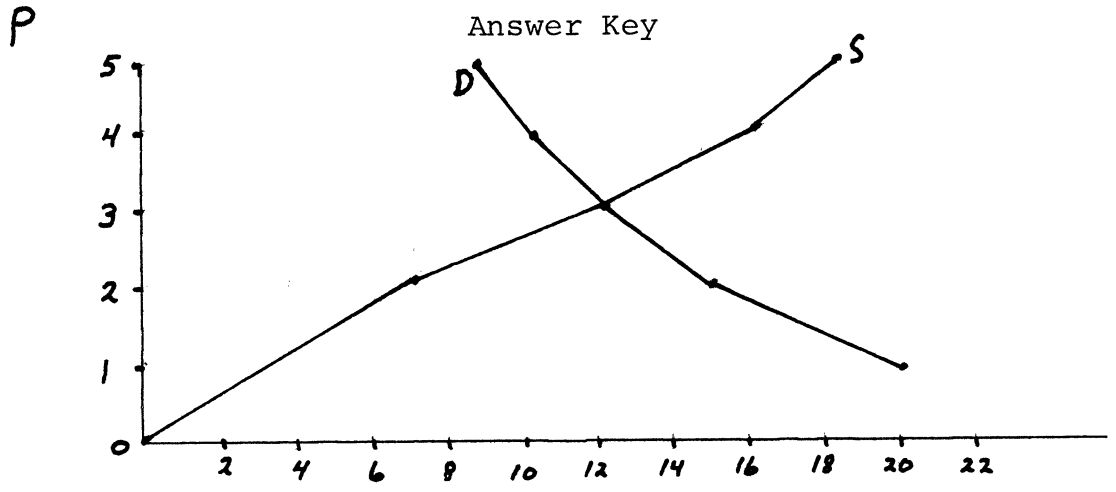
1. What will the market price be for the set of figures above?

2. What happens to the quantity demanded as the price increases?

3. What happens to the quantity supplied as the price increases?

Worksheet 8

Answer Key




1. $3 per bushel
2. When the price rises, the quantity demanded decreases.
3. When the price rises, the quantity supplied increases.

Handout 4

MARKET SIMULATION

"The Market" simulation game will help you increase your understanding of several concepts: demand, supply, and market price. Demand is made up of the desires of the consumers along with their ability to pay. Supply represents the quantities producers are willing to sell at various prices. Price is established by the forces of demand and supply.

You will work with a market model. This model simplifies the complicated real-life situation. Although a model is not reality, its workings and its basis are similar to a real situation. In order for the simulation to succeed, it is very important that you follow the rules closely.

You will imagine that you represent 100 college students and that each of your teammates represents 100 college students. The students you represent have the same likes and dislikes and the same allowance as you. All your living expenses are paid for except for several items: sweaters, books, and records. If you buy one sweater, all the students you represent will buy sweaters; so that exactly 100 sweaters will be needed to satisfy all of you. Likewise, if you buy three books, 300 books will be needed. Five records will represent 500.

During the simulation you will decide how to spend your allowance to get the highest number of utility points possible. The Factsheet lists the utility points earned for purchasing different quantities of each item. For example, buying three books will bring you 917 points and seven records will bring you 791 utility points. You may also earn points by saving money. Be sure to notice how the points change with the number of items purchased.

Before you begin to play the game, look over the Factsheet, Worksheets, and Handouts. The Factsheet contains the information you need to play "The Market," and the Worksheets are the records of your decisions.

Worksheet 1--Personal Budget and Utility Chart

This shows how much is purchased and at what price each item is purchased. It also shows how much is saved and the number of utility points you gain from your purchases. Notice that you cannot figure your total utility points

# FACTSHEET

## TABLE I Satisfaction from goods

| Units | Utility Points: Books | Sweaters | Records |
|---|---|---|---|
| 1 | 400 | 1022 | 167 |
| 2 | 677 | 1724 | 289 |
| 3 | 917 | 2215 | 399 |
| 4 | 1134 | 2510 | 505 |
| 5 | 1332 | 2585 | 605 |
| 6 | 1510 | 2600 | 701 |
| 7 | 1664 | 2609 | 791 |
| 8 | 1790 | 2616 | 871 |
| 9 | 1880 | 2621 | 937 |
| 10 | 1929 | 2625 | 986 |
| 11 | 1936 | 2628 | 1013 |
| 12 | 1940 | 2630 | 1018 |
| more than 12 | 1941 | 2631 | 1019 |

## TABLE II Satisfaction from savings

| Money Saved | Utility Points | Money Saved | Utility Points | Money Saved | Utility Points | Money Saved | Utility Points |
|---|---|---|---|---|---|---|---|
| $0.25 | 60 | $4.25 | 880 | $ 8.25 | 1380 | $12.25 | 1563 |
| 0.50 | 120 | 4.50 | 920 | 8.50 | 1400 | 12.50 | 1566 |
| 0.75 | 180 | 4.75 | 960 | 8.75 | 1420 | 12.75 | 1569 |
| 1.00 | 240 | 5.00 | 1000 | 9.00 | 1440 | 13.00 | 1572 |
| 1.25 | 295 | 5.25 | 1035 | 9.25 | 1455 | 13.25 | 1575 |
| 1.50 | 350 | 5.50 | 1070 | 9.50 | 1470 | 13.50 | 1578 |
| 1.75 | 405 | 5.75 | 1105 | 9.75 | 1485 | 13.75 | 1580 |
| 2.00 | 460 | 6.00 | 1140 | 10.00 | 1500 | 14.00 | 1582 |
| 2.25 | 510 | 6.25 | 1170 | 10.25 | 1510 | 14.25 | 1584 |
| 2.50 | 560 | 6.50 | 1200 | 10.50 | 1520 | 14.50 | 1586 |
| 2.75 | 610 | 6.75 | 1230 | 10.75 | 1530 | 14.75 | 1588 |
| 3.00 | 660 | 7.00 | 1260 | 11.00 | 1540 | 15.00 | 1589 |
| 3.25 | 705 | 7.25 | 1285 | 11.25 | 1545 | 15.25 | 1590 |
| 3.50 | 750 | 7.50 | 1310 | 11.50 | 1550 | 15.50 | 1591 |
| 3.75 | 795 | 7.75 | 1335 | 11.75 | 1555 | 15.75 | 1592 |
| 4.00 | 840 | 8.00 | 1360 | 12.00 | 1560 | 16.00 | 1593 |
| | | | | | | more than $16.00 | 1594 |

Handout 4--Continued

until your team has completed Worksheet 2 and prices have been found. Then you will know how much money you saved and how many utility points the remaining cash gives you.

Worksheet 2--Demand

On this sheet you record the quantity of each item the members of your team want. When you know the total amount of each item needed, then you can find the price by using the graphs.

Handouts 7, 8, 9--Supply curves for Books, Sweaters, and Records

The curves show the amounts for these items that producers will make available at various prices. For example, if your team needs a total of 1500 books, the price will be $1.50 for each book. If your team needs 5500 records, the price will be $1.35 for each record. Note how the supply curve for sweaters changes for different exercises.

Game procedure--Sample Simulation

Step 1: After you are given your allowance, decide how many of each item you want to buy, and tell the recorder for your team so that he can fill in Worksheet 2.

In the sample game, the student, John Doe, has an allowance of $45 with which he bought five books, seven sweaters, and four records.

Step 2: After each team member has reported his decision to the recorder, the recorder totals the amounts for each item. Then use the supply curves to determine the price for each item.

In the sample game, the team totals were thirty books, twenty-seven sweaters, and forty-five records. Since each student represents 100 people, the totals mean the demands were 3000 books, 2700 sweaters, and 4500 records. On the supply curves the prices are $1.75 for books, $4.10 for sweaters, and $1.10 for records.

Handout 4--Continued

Step 3: When you know the prices for your team, fill in Worksheet 1 by finding your expenditures.

In the sample game, John Doe spent $8.75 for books (5 x $1.75), $28.70 for sweaters (7 x $4.10), and $4.40 for records (4 x $1.10). He spent a total of $41.85, which means he saved $3.15.

Step 4: Use the Factsheet to find the number of utility points you earned and record this on Worksheet 1. Then total your utility points.

In the sample game, John got the following points:

5 books = 1332; 7 sweaters = 2609;
4 records = 505; savings = 705

# SAMPLE GAME

## WORKSHEET I

| | | Try 1 | |
|---|---|---|---|
| | | Budget | Utility Points |
| Books | Price (from Worksheet II) | 1.75 | |
| | Quantity Desired | 5 | |
| | Total Outlay | 8.75 | 1332 |
| Sweaters | Price (from Worksheet II) | 4.10 | |
| | Quantity | 7 | |
| | Total Outlay | 28.70 | 2609 |
| Records | Price (from Worksheet II) | 1.10 | |
| | Quantity Desired | 4 | |
| | Total Outlay | 4.40 | 505 |
| | Allowance | 45.00 | |
| | Total Spent | 41.85 | |
| | Total Saved | 3.15 | 705 |
| | Total Utility Points | | 5151 |

## WORKSHEET II

| Names of Students | Try 1 | | |
|---|---|---|---|
| | Books | Sweaters | Records |
| JOHN DOE | 5 | 7 | 4 |
| MARY SMITH | 5 | 5 | 4 |
| MIKE RAY | 4 | 4 | 5 |
| PEGGY GILBERT | 6 | 6 | 6 |
| JIM GRAY | 1 | 1 | 5 |
| TOTAL in hundreds | 30(00) | 27(00) | 45(00) |
| supply curve PRICE | 1.75 | 4.10 | 1.10 |

Handout 5: Personal Budget/Utility Chart

First Exercise — Second Exercise

| | | Try I | | Try II | | Try I | | Try II | |
|---|---|---|---|---|---|---|---|---|---|
| | | Budget | Utility Points | Budget | Utility Points | Budget | Utility Points | Budget | Utility Points |
| Books | Price (from Worksheet II) | | | | | | | | |
| | Quantity Desired | | | | | | | | |
| | Total Outlay | | | | | | | | |
| Sweaters | Price (from Worksheet II) | | | | | | | | |
| | Quantity | | | | | | | | |
| | Total Outlay | | | | | | | | |
| Records | Price (from Worksheet II) | | | | | | | | |
| | Quantity Desired | | | | | | | | |
| | Total Outlay | | | | | | | | |
| | Allowance | | | | | | | | |
| | Total Spent | | | | | | | | |
| | Total Saved | | | | | | | | |
| | Total Utility Points | | | | | | | | |

Third Exercise — Fourth Exercise

| | | Try I | | Try II | | Try I | | Try II | |
|---|---|---|---|---|---|---|---|---|---|
| | | Budget | Utility Points | Budget | Utility Points | Budget | Utility Points | Budget | Utility Points |
| Books | Price (from Worksheet II) | | | | | | | | |
| | Quantity Desired | | | | | | | | |
| | Total Outlay | | | | | | | | |
| Sweaters | Price (from Worksheet II) | | | | | | | | |
| | Quantity | | | | | | | | |
| | Total Outlay | | | | | | | | |
| Records | Price (from Worksheet II) | | | | | | | | |
| | Quantity Desired | | | | | | | | |
| | Total Outlay | | | | | | | | |
| | Allowance | | | | | | | | |
| | Total Spent | | | | | | | | |
| | Total Saved | | | | | | | | |
| | Total Utility Points | | | | | | | | |

# Handout 6: Demand

First Exercise

| Names of Students | Quantity Bought | | | | | |
|---|---|---|---|---|---|---|
| | Try I | | | Try II | | |
| | Books | Sweaters | Records | Books | Sweaters | Records |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| TOTAL in hundreds | | | | | | |
| supply curve PRICE | | | | | | |

Second Exercise

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| TOTAL in hundreds | | | | | | |
| supply curve PRICE | | | | | | |

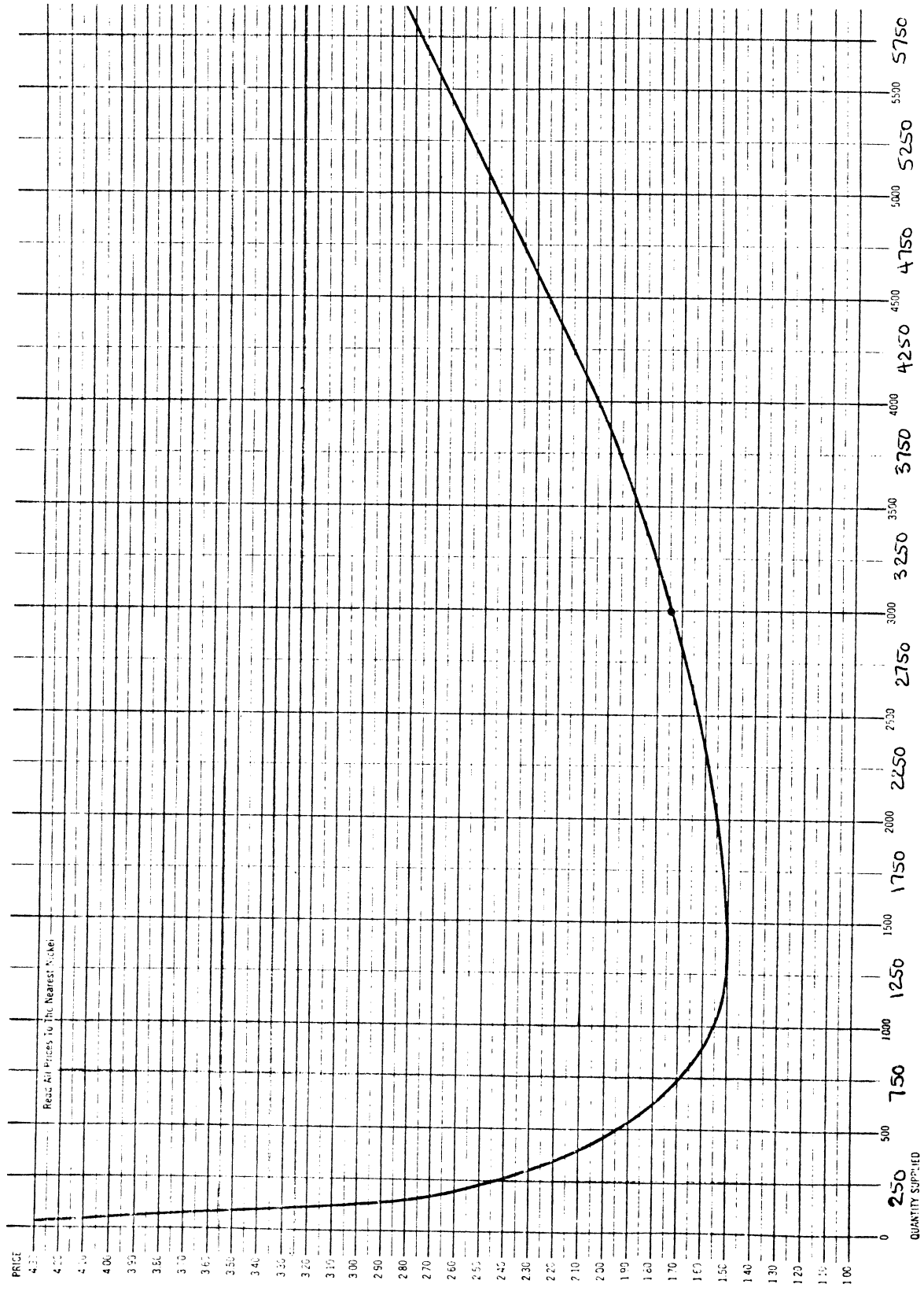
Third Exercise

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| TOTAL in hundreds | | | | | | |
| supply curve PRICE | | | | | | |

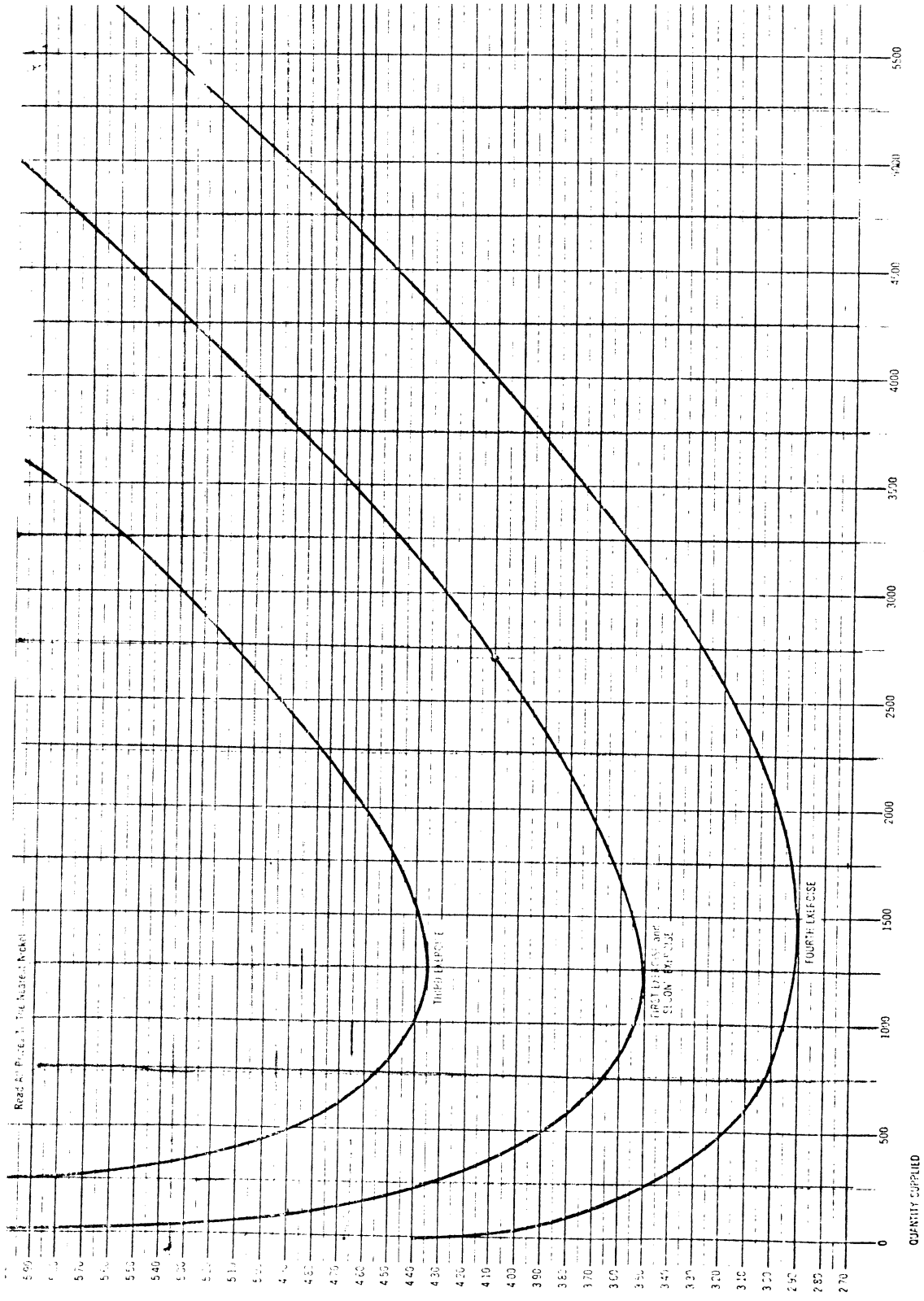
Fourth Exercise

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| TOTAL in hundreds | | | | | | |
| supply curve PRICE | | | | | | |

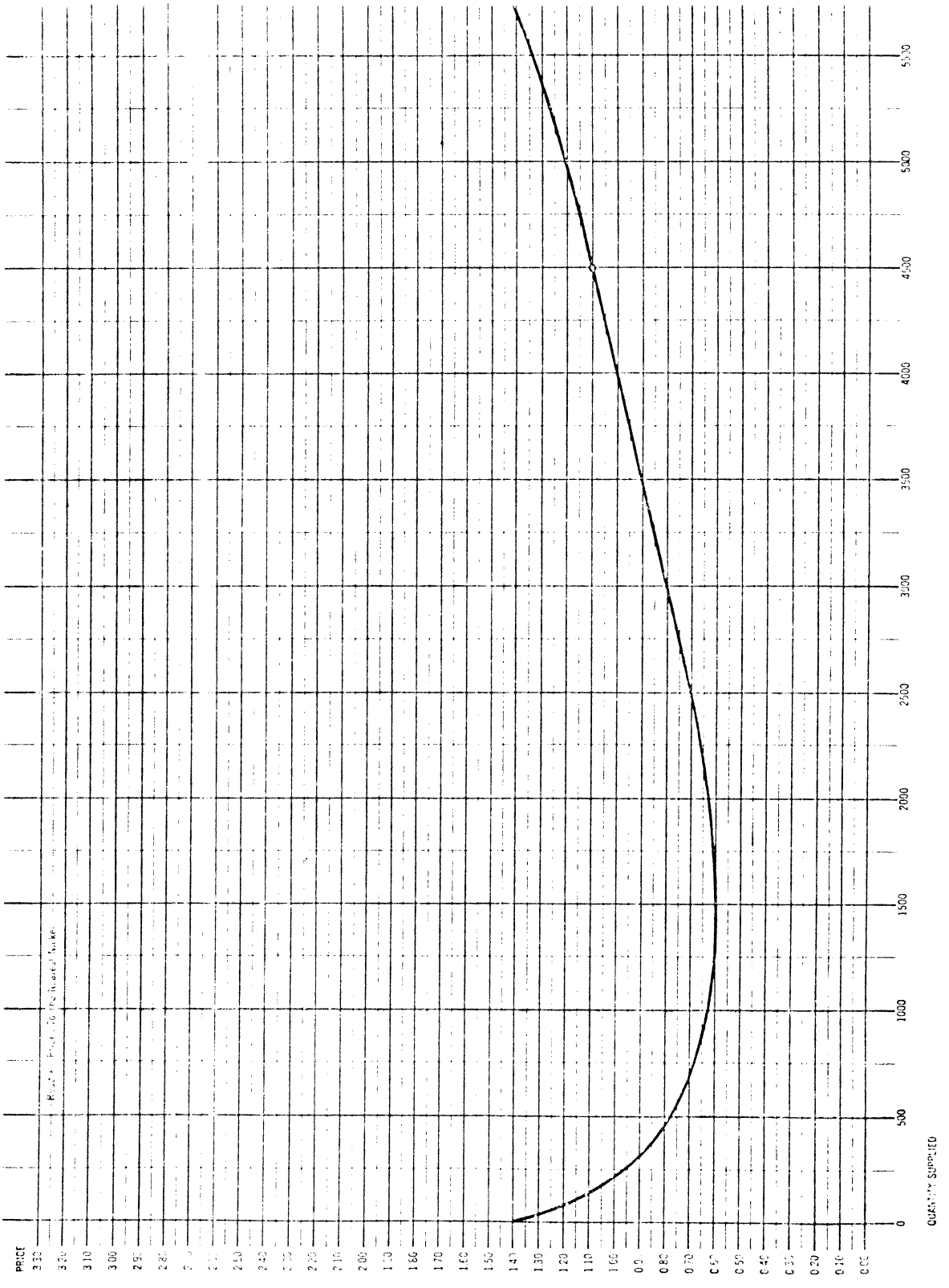
# Handout 7: Supply Curve for Books



# Handout 8: Supply Curves for Sweaters



# Handout 9: Supply Curve for Records



# Handout 10: Multiplication Table

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.60 | 1.20 | 1.80 | 2.40 | 3.00 | 3.60 | 4.20 | 4.80 | 5.40 | 6.00 | 6.60 |
| 0.65 | 1.30 | 1.95 | 2.60 | 3.25 | 3.90 | 4.55 | 5.20 | 5.85 | 6.50 | 7.15 |
| 0.70 | 1.40 | 2.10 | 2.80 | 3.50 | 4.20 | 4.90 | 5.60 | 6.30 | 7.00 | 7.70 |
| 0.75 | 1.50 | 2.25 | 3.00 | 3.75 | 4.50 | 5.25 | 6.00 | 6.75 | 7.50 | 8.25 |
| 0.80 | 1.60 | 2.40 | 3.20 | 4.00 | 4.80 | 5.60 | 6.40 | 7.20 | 8.00 | 8.80 |
| 0.85 | 1.70 | 2.55 | 3.40 | 4.25 | 5.10 | 5.95 | 6.80 | 7.65 | 8.50 | 9.35 |
| 0.90 | 1.80 | 2.70 | 3.60 | 4.50 | 5.40 | 6.30 | 7.20 | 8.10 | 9.00 | 9.90 |
| 0.95 | 1.90 | 2.85 | 3.80 | 4.75 | 5.70 | 6.65 | 7.60 | 8.55 | 9.50 | 10.45 |
| 1.00 | 2.00 | 3.00 | 4.00 | 5.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 |
| 1.05 | 2.10 | 3.15 | 4.20 | 5.25 | 6.30 | 7.35 | 8.40 | 9.45 | 10.50 | 11.55 |
| 1.10 | 2.20 | 3.30 | 4.40 | 5.50 | 6.60 | 7.70 | 8.80 | 9.90 | 11.00 | 12.10 |
| 1.15 | 2.30 | 3.45 | 4.60 | 5.75 | 6.90 | 8.05 | 9.20 | 10.35 | 11.50 | 12.65 |
| 1.20 | 2.40 | 3.60 | 4.80 | 6.00 | 7.20 | 8.40 | 9.60 | 10.80 | 12.00 | 13.20 |
| 1.25 | 2.50 | 3.75 | 5.00 | 6.25 | 7.50 | 8.75 | 10.00 | 11.25 | 12.50 | 13.75 |
| 1.30 | 2.60 | 3.90 | 5.20 | 6.50 | 7.80 | 9.10 | 10.40 | 11.70 | 13.00 | 14.30 |
| 1.35 | 2.70 | 4.05 | 5.40 | 6.75 | 8.10 | 9.45 | 10.80 | 12.15 | 13.50 | 14.85 |
| 1.40 | 2.80 | 4.20 | 5.60 | 7.00 | 8.40 | 9.80 | 11.20 | 12.60 | 14.00 | 15.40 |
| 1.45 | 2.90 | 4.35 | 5.80 | 7.25 | 8.70 | 10.15 | 11.60 | 13.05 | 14.50 | 15.95 |
| 1.50 | 3.00 | 4.50 | 6.00 | 7.50 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 | 16.50 |
| 1.55 | 3.10 | 4.65 | 6.20 | 7.75 | 9.30 | 10.85 | 12.40 | 13.95 | 15.50 | 17.05 |
| 1.60 | 3.20 | 4.80 | 6.40 | 8.00 | 9.60 | 11.20 | 12.80 | 14.40 | 16.00 | 17.60 |
| 1.65 | 3.30 | 4.95 | 6.60 | 8.25 | 9.90 | 11.55 | 13.20 | 14.85 | 16.50 | 18.15 |
| 1.70 | 3.40 | 5.10 | 6.80 | 8.50 | 10.20 | 11.90 | 13.60 | 15.30 | 17.00 | 18.70 |
| 1.75 | 3.50 | 5.25 | 7.00 | 8.75 | 10.50 | 12.25 | 14.00 | 15.75 | 17.50 | 19.25 |
| 1.80 | 3.60 | 5.40 | 7.20 | 9.00 | 10.80 | 12.60 | 14.40 | 16.20 | 18.00 | 19.80 |
| 1.85 | 3.70 | 5.55 | 7.40 | 9.25 | 11.10 | 12.95 | 14.80 | 16.65 | 18.50 | 20.35 |
| 1.90 | 3.80 | 5.70 | 7.60 | 9.50 | 11.40 | 13.30 | 15.20 | 17.10 | 19.00 | 20.90 |
| 1.95 | 3.90 | 5.85 | 7.80 | 9.75 | 11.70 | 13.65 | 15.60 | 17.55 | 19.50 | 21.45 |
| 2.00 | 4.00 | 6.00 | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 22.00 |
| 2.05 | 4.10 | 6.15 | 8.20 | 10.25 | 12.30 | 14.35 | 16.40 | 18.45 | 20.50 | 22.55 |
| 2.10 | 4.20 | 6.30 | 8.40 | 10.50 | 12.60 | 14.70 | 16.80 | 18.90 | 21.00 | 23.10 |
| 2.15 | 4.30 | 6.45 | 8.60 | 10.75 | 12.90 | 15.05 | 17.20 | 19.35 | 21.50 | 23.65 |
| 2.20 | 4.40 | 6.60 | 8.80 | 11.00 | 13.20 | 15.40 | 17.60 | 19.80 | 22.00 | 24.20 |
| 2.25 | 4.50 | 6.75 | 9.00 | 11.25 | 13.50 | 15.75 | 18.00 | 20.25 | 22.50 | 24.75 |
| 2.30 | 4.60 | 6.90 | 9.20 | 11.50 | 13.80 | 16.10 | 18.40 | 20.70 | 23.00 | 25.30 |
| 2.35 | 4.70 | 7.05 | 9.40 | 11.75 | 14.10 | 16.45 | 18.80 | 21.15 | 23.50 | 25.85 |
| 2.40 | 4.80 | 7.20 | 9.60 | 12.00 | 14.40 | 16.80 | 19.20 | 21.60 | 24.00 | 26.40 |
| 2.45 | 4.90 | 7.35 | 9.80 | 12.25 | 14.70 | 17.15 | 19.60 | 22.05 | 24.50 | 26.95 |
| 2.50 | 5.00 | 7.50 | 10.00 | 12.50 | 15.00 | 17.50 | 20.00 | 22.50 | 25.00 | 27.50 |
| 2.55 | 5.10 | 7.65 | 10.20 | 12.75 | 15.30 | 17.85 | 20.40 | 22.95 | 25.50 | 28.05 |
| 2.60 | 5.20 | 7.80 | 10.40 | 13.00 | 15.60 | 18.20 | 20.80 | 23.40 | 26.00 | 28.60 |
| 2.65 | 5.30 | 7.95 | 10.60 | 13.25 | 15.90 | 18.55 | 21.20 | 23.85 | 26.50 | 29.15 |
| 2.70 | 5.40 | 8.10 | 10.80 | 13.50 | 16.20 | 18.90 | 21.60 | 24.30 | 27.00 | 29.70 |
| 2.75 | 5.50 | 8.25 | 11.00 | 13.75 | 16.50 | 19.25 | 22.00 | 24.75 | 27.50 | 30.25 |
| 2.80 | 5.60 | 8.40 | 11.20 | 14.00 | 16.80 | 19.60 | 22.40 | 25.20 | 28.00 | 30.80 |
| 2.85 | 5.70 | 8.55 | 11.40 | 14.25 | 17.10 | 19.95 | 22.80 | 25.65 | 28.50 | 31.35 |
| 2.90 | 5.80 | 8.70 | 11.60 | 14.50 | 17.40 | 20.30 | 23.20 | 26.10 | 29.00 | 31.90 |
| 2.95 | 5.90 | 8.85 | 11.80 | 14.75 | 17.70 | 20.65 | 23.60 | 26.55 | 29.50 | 32.45 |
| 3.00 | 6.00 | 9.00 | 12.00 | 15.00 | 18.00 | 21.00 | 24.00 | 27.00 | 30.00 | 33.00 |
| 3.05 | 6.10 | 9.15 | 12.20 | 15.25 | 18.30 | 21.35 | 24.40 | 27.45 | 30.50 | 33.55 |
| 3.10 | 6.20 | 9.30 | 12.40 | 15.50 | 18.60 | 21.70 | 24.80 | 27.90 | 31.00 | 34.10 |
| 3.15 | 6.30 | 9.45 | 12.60 | 15.75 | 18.90 | 22.05 | 25.20 | 28.35 | 31.50 | 34.65 |
| 3.20 | 6.40 | 9.60 | 12.80 | 16.00 | 19.20 | 22.40 | 25.60 | 28.80 | 32.00 | 35.20 |
| 3.25 | 6.50 | 9.75 | 13.00 | 16.25 | 19.50 | 22.75 | 26.00 | 29.25 | 32.50 | 35.75 |
| 3.30 | 6.60 | 9.90 | 13.20 | 16.50 | 19.80 | 23.10 | 26.40 | 29.70 | 33.00 | 36.30 |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.35 | 6.70 | 10.05 | 13.40 | 16.75 | 20.10 | 23.45 | 26.80 | 30.15 | 33.50 | 36.85 |
| 3.40 | 6.80 | 10.20 | 13.60 | 17.00 | 20.40 | 23.80 | 27.20 | 30.60 | 34.00 | 37.40 |
| 3.45 | 6.90 | 10.35 | 13.80 | 17.25 | 20.70 | 24.15 | 27.60 | 31.05 | 34.50 | 37.95 |
| 3.50 | 7.00 | 10.50 | 14.00 | 17.50 | 21.00 | 24.50 | 28.00 | 31.50 | 35.00 | 38.50 |
| 3.55 | 7.10 | 10.65 | 14.20 | 17.75 | 21.30 | 24.85 | 28.40 | 31.95 | 35.50 | 39.05 |
| 3.60 | 7.20 | 10.80 | 14.40 | 18.00 | 21.60 | 25.20 | 28.80 | 32.40 | 36.00 | 39.60 |
| 3.65 | 7.30 | 10.95 | 14.60 | 18.25 | 21.90 | 25.55 | 29.20 | 32.85 | 36.50 | 40.15 |
| 3.70 | 7.40 | 11.10 | 14.80 | 18.50 | 22.20 | 25.90 | 29.60 | 33.30 | 37.00 | 40.70 |
| 3.75 | 7.50 | 11.25 | 15.00 | 18.75 | 22.50 | 26.25 | 30.00 | 33.75 | 37.50 | 41.25 |
| 3.80 | 7.60 | 11.40 | 15.20 | 19.00 | 22.80 | 26.60 | 30.40 | 34.20 | 38.00 | 41.80 |
| 3.85 | 7.70 | 11.55 | 15.40 | 19.25 | 23.10 | 26.95 | 30.80 | 34.65 | 38.50 | 42.35 |
| 3.90 | 7.80 | 11.70 | 15.60 | 19.50 | 23.40 | 27.30 | 31.20 | 35.10 | 39.00 | 42.90 |
| 3.95 | 7.90 | 11.85 | 15.80 | 19.75 | 23.70 | 27.65 | 31.60 | 35.55 | 39.50 | 43.45 |
| 4.00 | 8.00 | 12.00 | 16.00 | 20.00 | 24.00 | 28.00 | 32.00 | 36.00 | 40.00 | 44.00 |
| 4.05 | 8.10 | 12.15 | 16.20 | 20.25 | 24.30 | 28.35 | 32.40 | 36.45 | 40.50 | 44.55 |
| 4.10 | 8.20 | 12.30 | 16.40 | 20.50 | 24.60 | 28.70 | 32.80 | 36.90 | 41.00 | 45.10 |
| 4.15 | 8.30 | 12.45 | 16.60 | 20.75 | 24.90 | 29.05 | 33.20 | 37.35 | 41.50 | 45.65 |
| 4.20 | 8.40 | 12.60 | 16.80 | 21.00 | 25.20 | 29.40 | 33.60 | 37.80 | 42.00 | 46.20 |
| 4.25 | 8.50 | 12.75 | 17.00 | 21.25 | 25.50 | 29.75 | 34.00 | 38.25 | 42.50 | 46.75 |
| 4.30 | 8.60 | 12.90 | 17.20 | 21.50 | 25.80 | 30.10 | 34.40 | 38.70 | 43.00 | 47.30 |
| 4.35 | 8.70 | 13.05 | 17.40 | 21.75 | 26.10 | 30.45 | 34.80 | 39.15 | 43.50 | 47.85 |
| 4.40 | 8.80 | 13.20 | 17.60 | 22.00 | 26.40 | 30.80 | 35.20 | 39.60 | 44.00 | 48.40 |
| 4.45 | 8.90 | 13.35 | 17.80 | 22.25 | 26.70 | 31.15 | 35.60 | 40.05 | 44.50 | 48.95 |
| 4.50 | 9.00 | 13.50 | 18.00 | 22.50 | 27.00 | 31.50 | 36.00 | 40.50 | 45.00 | 49.50 |
| 4.55 | 9.10 | 13.65 | 18.20 | 22.75 | 27.30 | 31.85 | 36.40 | 40.95 | 45.50 | 50.05 |
| 4.60 | 9.20 | 13.80 | 18.40 | 23.00 | 27.60 | 32.20 | 36.80 | 41.40 | 46.00 | 50.60 |
| 4.65 | 9.30 | 13.95 | 18.60 | 23.25 | 27.90 | 32.55 | 37.20 | 41.85 | 46.50 | 51.15 |
| 4.70 | 9.40 | 14.10 | 18.80 | 23.50 | 28.20 | 32.90 | 37.60 | 42.30 | 47.00 | 51.70 |
| 4.75 | 9.50 | 14.25 | 19.00 | 23.75 | 28.50 | 33.25 | 38.00 | 42.75 | 47.50 | 52.25 |
| 4.80 | 9.60 | 14.40 | 19.20 | 24.00 | 28.80 | 33.60 | 38.40 | 43.20 | 48.00 | 52.80 |
| 4.85 | 9.70 | 14.55 | 19.40 | 24.25 | 29.10 | 33.95 | 38.80 | 43.65 | 48.50 | 53.35 |
| 4.90 | 9.80 | 14.70 | 19.60 | 24.50 | 29.40 | 34.30 | 39.20 | 44.10 | 49.00 | 53.90 |
| 4.95 | 9.90 | 14.85 | 19.80 | 24.75 | 29.70 | 34.65 | 39.60 | 44.55 | 49.50 | 54.45 |
| 5.00 | 10.00 | 15.00 | 20.00 | 25.00 | 30.00 | 35.00 | 40.00 | 45.00 | 50.00 | 55.00 |
| 5.05 | 10.10 | 15.15 | 20.20 | 25.25 | 30.30 | 35.35 | 40.40 | 45.45 | 50.50 | 55.55 |
| 5.10 | 10.20 | 15.30 | 20.40 | 25.50 | 30.60 | 35.70 | 40.80 | 45.90 | 51.00 | 56.10 |
| 5.15 | 10.30 | 15.45 | 20.60 | 25.75 | 30.90 | 36.05 | 41.20 | 46.35 | 51.50 | 56.65 |
| 5.20 | 10.40 | 15.60 | 20.80 | 26.00 | 31.20 | 36.40 | 41.60 | 46.80 | 52.00 | 57.20 |
| 5.25 | 10.50 | 15.75 | 21.00 | 26.25 | 31.50 | 36.75 | 42.00 | 47.25 | 52.50 | 57.75 |
| 5.30 | 10.60 | 15.90 | 21.20 | 26.50 | 31.80 | 37.10 | 42.40 | 47.70 | 53.00 | 58.30 |
| 5.35 | 10.70 | 16.05 | 21.40 | 26.75 | 32.10 | 37.45 | 42.80 | 48.15 | 53.50 | 58.85 |
| 5.40 | 10.80 | 16.20 | 21.60 | 27.00 | 32.40 | 37.80 | 43.20 | 48.60 | 54.00 | 59.40 |
| 5.45 | 10.90 | 16.35 | 21.80 | 27.25 | 32.70 | 38.15 | 43.60 | 49.05 | 54.50 | 59.95 |
| 5.50 | 11.00 | 16.50 | 22.00 | 27.50 | 33.00 | 38.50 | 44.00 | 49.50 | 55.00 | 60.50 |
| 5.55 | 11.10 | 16.65 | 22.20 | 27.75 | 33.30 | 38.85 | 44.40 | 49.95 | 55.50 | 61.05 |
| 5.60 | 11.20 | 16.80 | 22.40 | 28.00 | 33.60 | 39.20 | 44.80 | 50.40 | 56.00 | 61.60 |
| 5.65 | 11.30 | 16.95 | 22.60 | 28.25 | 33.90 | 39.55 | 45.20 | 50.85 | 56.50 | 62.15 |
| 5.70 | 11.40 | 17.10 | 22.80 | 28.50 | 34.20 | 39.90 | 45.60 | 51.30 | 57.00 | 62.70 |
| 5.75 | 11.50 | 17.25 | 23.00 | 28.75 | 34.50 | 40.25 | 46.00 | 51.75 | 57.50 | 63.25 |
| 5.80 | 11.60 | 17.40 | 23.20 | 29.00 | 34.80 | 40.60 | 46.40 | 52.20 | 58.00 | 63.80 |
| 5.85 | 11.70 | 17.55 | 23.40 | 29.25 | 35.10 | 40.95 | 46.80 | 52.65 | 58.50 | 64.35 |
| 5.90 | 11.80 | 17.70 | 23.60 | 29.50 | 35.40 | 41.30 | 47.20 | 53.10 | 59.00 | 64.90 |
| 5.95 | 11.90 | 17.85 | 23.80 | 29.75 | 35.70 | 41.65 | 47.60 | 53.55 | 59.50 | 65.45 |
| 6.00 | 12.00 | 18.00 | 24.00 | 30.00 | 36.00 | 42.00 | 48.00 | 54.00 | 60.00 | 66.00 |
| 6.05 | 12.10 | 18.15 | 24.20 | 30.25 | 36.30 | 42.35 | 48.40 | 54.45 | 60.50 | 66.55 |

Overhead Transparency Plate 1

| Round | Price Index | Item 1 | Item 2 | Item 3 | Item 4 | Item 5 | Item 6 |
|---|---|---|---|---|---|---|---|
| Second | 100 | $100 | $1.00 | $10.00 | $500 | $3.00 | $.50 |
| Third | 124 | | | | | | |
| Fourth | 84 | | | | | | |

Overhead Transparency Plate 1

Answer Key

| Round | Price Index | Item 1 | Item 2 | Item 3 | Item 4 | Item 5 | Item 6 |
|---|---|---|---|---|---|---|---|
| Second | 100 | $100 | $1.00 | $10.00 | $500 | $3.00 | $.50 |
| Third | 124 | 124 | 1.24 | 12.40 | 620 | 3.72 | .62 |
| Fourth | 84 | 84 | .84 | 8.40 | 420 | 2.52 | .42 |

# APPENDIX C

Texas Education Agency

• STATE BOARD OF EDUCATION
• STATE COMMISSIONER OF EDUCATION
• STATE DEPARTMENT OF EDUCATION

201 East Eleventh Street
Austin, Texas
78701

November 13, 1973

Mr. Daniel M. Schmeling
North Texas State University
Center for Economic Education
Denton, Texas 76203

Dear Mr. Schmeling:

This office is in receipt of your request of November 7 concerning enrollment data. Enclosed please find this data.

Please contact this office if further assistance is needed.

Sincerely yours,

Jerry T. Barton, Director of Research

RESEARCH OFFICE, MIC

JTB:BAB:ec

Encls:

Texas Education Agency
Management Information Center

Enrollment Data for Selected Years

| Year | Twelfth Grade | Ninth through Twelfth Grades |
|---|---|---|
| 1968-69 | 147,436 | 739,456 |
| 1969-70 | 151,893 | 761,438 |
| 1970-71 | 159,865 | 785,047 |
| 1971-72 | 164,563 | 803,966 |
| 1972-73 | 163,626 | 813,230 |

Source: Superintendent's Annual Report, Part I.

Research Office
November 13, 1973

Texas Education Agency

• STATE BOARD OF EDUCATION
• STATE COMMISSIONER OF EDUCATION
• STATE DEPARTMENT OF EDUCATION

201 East Eleventh Street
Austin, Texas
78701

November 1, 1973

Mr. Dan Schmeling
Center for Economic Education
North Texas State University
NT Box 5427
Denton, Texas 76203

Dear Mr. Schmeling:

The following are the enrollments for the Economics course you requested. These reflect first-semester enrollment only. A general rule-of-thumb we follow is that the second semester enrollment is about the same or slightly larger as reflected in the 1972-73 figures.

| | |
|---|---|
| 1972-73 | 11,764 (fall semester) 12,904(est., spring) |
| 1971-72 | 12,103 |
| 1970-71 | 12,725 |
| 1969-70 | 12,894 |
| 1968-69 | 14,792 |
| 1967-68 | 12,481 |

Obviously, enrollment has maintained a rather stable figure. There may be a slight downward trend emerging as we have had a rapid increase of enrollment in sociology and psychology courses.

Enclosed is a list of state supervisors you may wish to contact.

Sincerely yours,

Louis Grigar

Louis Grigar
Social Studies Consultant
Division of Program Development

LG:jm
Enclosure

PERSONAL DATA SHEET

Student Name: _____

| | | |
|---|---|---|
| Student Number: | ___ ___ ___ | (1-3) |
| Teacher Number: | ___ | (4) |
| Method Number: | ___ | (5) |
| Group: | ___ ___ | (6-7) |
| Student Sex: | ___ | (8) |
| Student Grade Level: | ___ | (9) |
| Student I.Q.: | ___ ___ ___ | (10-12) |
| Education: ___X 4 | | |
| Occupation: ___ X 7 | | |
| Index of Social Position: | ___ ___ | (13-14) |
| Mathematics Pretest: | ___ ___ | (15-16) |
| Mathematics Posttest: | ___ ___ | (17-18) |
| Mathematics 30-Day Retention Test: | ___ ___ | (19-20) |
| Mathematics 60-Day Retention Test: | ___ ___ | (21-22) |
| Economics Pretest: | ___ ___ | (23-24) |
| Economics Posttest: | ___ ___ | (25-26) |
| Economics 30-Day Retention Test: | ___ ___ | (27-28) |
| Economics 60-Day Retention Test: | ___ ___ | (29-30) |
| Attitudes toward Mathematics Pretest: | ___ ___ | (31-32) |
| Attitudes toward Mathematics Posttest: | ___ ___ | (33-34) |
| Attitudes toward Mathematics 30-Day Retention Test: | ___ ___ | (35-36) |
| Attitudes toward Mathematics 60-Day Retention Test: | ___ ___ | (37-38) |
| Attitudes toward Economics Pretest: | ___ ___ | (39-40) |
| Attitudes toward Economics Posttest: | ___ ___ | (41-42) |
| Attitudes toward Economics 30-Day Retention Test: | ___ ___ | (43-44) |
| Attitudes toward Economics 60-Day Retention Test: | ___ ___ | (45-46) |

The purpose of the following survey is to measure your attitudes toward economics and mathematics. There are, of course, no "right" or "wrong" answers. If you feel that your attitudes are VERY CLOSELY related to either end of the scale, mark at the appropriate end. The other spaces represent various degrees of feeling. Never fill in more than one box on a single adjective-pair scale. Make each item a separate and independent judgment. Work at a fairly high speed through this survey section; we want your first impressions toward economics and mathematics.

ATTITUDE TOWARD MATHEMATICS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Valuable | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Worthless | _____ (1) |
| Good | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Bad | _____ (2) |
| Unimportant | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Important | _____ (3) |
| Easy | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Difficult | _____ (4) |
| Foolish | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Wise | _____ (5) |
| Boring | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Interesting | _____ (6) |
| Alive | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Dead | _____ (7) |
| Clear | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Hazy | _____ (8) |
| Weak | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Powerful | _____ (9) |
| Happy | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Sad | _____ (10) |

ATTITUDE TOWARD ECONOMICS

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Valuable | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Worthless | _____ (11) |
| Good | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Bad | _____ (12) |
| Unimportant | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Important | _____ (13) |
| Easy | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Difficult | _____ (14) |
| Foolish | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Wise | _____ (15) |
| Boring | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Interesting | _____ (16) |
| Alive | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Dead | _____ (17) |
| Clear | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Hazy | _____ (18) |
| Weak | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Powerful | _____ (19) |
| Happy | _____: | _____: | _____: | _____: | _____: | _____: | _____: | Sad | _____ (20) |

# TEACHER CHARACTERISTICS

NAME _____

IDENTIFICATION NUMBER ____ ____ (1-2)

SEX 1 = Male 2 = Female ____ (3)

AGE ____ ____ (4-5)

NO. OF YEARS TEACHING EXPERIENCE ____ ____ (6-7)

MAJOR TEACHING FIELD ____ (8)

1 = Mathematics 3 = English 5 = Science
2 = Economics 4 = Social Studies 6 = Other

NO. OF CREDITS IN ECONOMICS ____ ____ (9-10)

UNDERGRADUATE GRADE POINT AVERAGE ____ ____ (11-12)
(On 4.0 Basis)

# TWO-FACTOR INDEX OF SOCIAL POSITION

August B. Hollingshead
Yale University

## Brief Instructions

The Two-Factor Index utilitzed occupation and education. These factors are scaled and weighted individually, and a single score is obtained.

The educational scale is based upon the years of school completed by the head of the household. The scale values are as follows:

| Years of School Completed | Scale Value |
|---|---|
| Professional (MA, MS, ME, MD, PhD, LLB, etc) | 1 |
| Four-year college graduate (AB, BS, BM) | 2 |
| 1-3 years college (also business schools) | 3 |
| High school graduate | 4 |
| 10-11 years of school (part high school) | 5 |
| 7-9 years of school | 6 |
| Under 7 years of school | 7 |

The occupational scale is attached on a separate sheet. Its effective use is dependent on the precise knowledge of the head of the household's occupation. Occupational position has a factor weight of 7 and educational position a factor weight of 4. These weights are multiplied by the scale value for education and occupation of each individual or head of a household. The calculated weighted score gives the approximate position of the family on the over-all scale. For example, John Smith is the manager of a Safeway Store; he completed high school and one year of business college. I would score him as follows:

| Factor | Scale Score | Factor Weight | Score x Weight |
|---|---|---|---|
| Occupation | 3 | 7 | 21 |
| Education | 3 | 4 | 12 |
| Index of Social Position Score ... | | | 33 |

When the Index of Social Position score is calculated, the individual may be stratified either on the continuum of scores or into a "class." In the case of John Smith, I would rate him a Class III on the basis of the position he occupies on the continuum of scores, and the way the scores are grouped into classes.

The range of scores in each class on the Two-Factor Index follows:

| Class | ISP Scores |
|---|---|
| I | 11-17 |
| II | 18-31 |
| III | 32-47 |
| IV | 48-63 |
| V | 64-77 |

The various combinations of scale scores for occupation and education are reproducible in the Guttman sense for there is no overlap between education-occupation combinations. If an individual's education and occupation are known, one can calculate his score. Conversely, if one knows an individual's score, he can calculate both occupational position and educational level.

We have made extensive studies of the reliability of scoring, and the validity of the Index on over one hundred variables in our Social Stratification and Psychiatric Disorders Study. We have also made studies of loss of precision in using the Two-Factor Index rather than the three-factor one of occupation, education, and ecological area of residence. We recommend the Two-Factor one in areas where ecological maps do not exist.

# INDEX OF SOCIAL POSITION

A. B. Hollingshead
Yale University

## SEVEN SOCIOECONOMIC SCALE POSITIONS

1. Higher Executives of Large Concerns, Proprietors, and Major Professionals.

   A. Higher Executives (Value of corporation $500,000 and above as rated by Dunn and Bradstreet)

   Bank presidents
   Vice-presidents
   Assistant vice-presidents
   Business: Directors
   Presidents
   Vice-Presidents
   Executive secretary
   Research directors
   Treasurer

   B. Proprietors (Value over $100,000 by Dunn and Bradstreet)

   Brokers
   Contractors
   Dairy Owners
   Farmers
   Lumber dealers

   C. Major Professionals

   Accountants (CPA)
   Actuaries
   Agronomists
   Architects
   Artists, portrait
   Astronomers
   Auditors
   Bacteriologists
   Chemical Engineers
   Chemists
   Clergymen (professionally trained)
   Dentists
   Economists
   Engineers (college grad)
   Foresters
   Geologists
   Judges (Superior courts)
   Lawyers
   Metallurgists
   Military: Comm. officers, Major and above, Officials of the Executive Branch of Government, Federal, State, Local; e.g., Major, City Manager, City Plan Director, Internal Revenue Dir.
   Physicians
   Physicists, Research
   Psychologists, practicing
   Symphony conductor
   Teachers, university, college
   Veterinarians (veterinary surgeons)

2. Business Managers, Proprietors of Medium-Sized Businesses, and Lesser Professionals.

A. Business Managers in Large Concerns (Value $500,000)

Advertising directors
Branch managers
Brokerage salesmen
Directors of purchasing
District managers
Executive assistants
Export managers, Int. concern
Govt. officials, minor; e.g., Internal Revenue agents
Farm managers
Manufacturer's representatives
Office managers
Personnel managers
Police chief; sheriff
Postmaster
Production managers
Sales engineers
Sales managers, national concerns
Store managers

B. Proprietors of Medium Businesses (Value $35,000-$100,000)

Advertising
Clothing store
Contractors
Express Company
Fruits, wholesale
Furniture business
Farm owners
Poultry business
Real estate brokers
Rug business
Store
Theater

C. Lesser Professionals

Accountants (not CPA)
Chiropodists
Chiropractors
Correction officers
Director of Community House
Engineers (not college graduate)
Finance writers
Health educators
Labor relations consultants
Librarians
Military: Comm. officers, Lts., Captain
Musicians (symphony orchestra)
Nurses
Opticians
Optometrists, D.O.
Pharmacists
Public health officers (NPH)
Research assistants, univ. (full-time)
Social workers
Teachers, elementary and high school

3. Administrative Personnel, Owners of Small Businesses, and Minor Professionals.

A. Administrative Personnel

Advertising agents
Chief clerks
Credit managers
Insurance agents
Managers, departments
Passenger agents--RR
Private secretaries
Purchasing agents
Sales representatives
Section heads, Federal, State and Local governmental offices
Section heads, large businesses and industries
Service managers
Store managers (chain)
Shop managers
Traffic managers

B. Small Business Owners ($6,000-$35,000)

Art gallery
Auto accessories
Awnings
Bakery
Beauty shop
Boatyard
Brokerage, insurance
Car dealers
Cattle dealers
Cigarette machines
Cleaning shops
Clothing
Coal businesses
Convalescent homes
Decorating
Dog supplies
Dry goods
Engraving business
Feed
Finance companies, local
Fire extinguishers
Five and Dime
Florist
Food equipment
Food products
Foundry
Funeral directors
Furniture
Garage
Gas station
Glassware
Grocery--general
Hotel proprietors
Jewelry
Machinery brokers
Manufacturing
Monuments
Music
Package stores (liquor)
Paint Contracting
Poultry
Real estate
Records and radios
Restaurant
Roofing contractors
Shoe
Signs
Tavern
Taxi company
Tire shop
Trucking
Trucks and tractors
Upholstery
Wholesale outlets
Window shades
Contracting businesses

C. Semi-professionals

Actors and showmen
Army M/Sgt; Navy, CPO
Artists, commercial
Appraisers (estimators)
Clergymen (not professionally trained)
Concern managers
Deputy sheriffs
Interior decorators
Interpreters, courts
Laboratory assistants
Landscape planners
Morticians
Oral Hygienists
Physio-therapists
Piano teachers
Publicity and public relations
Radio, TV announcers
Reporters, court
Reporters, newspapers
Surveyors
Title searchers
Tool designers
Travel agents
Yard masters, RR
Dispatchers, RR
Photographers

D. Farmers

Farm owners ($20,000-$35,000)

4. Clerical and Sales Workers, Technicians, and Owners of Little Businesses (Value under $6,000)

A. Clerical and Sales Workers

Bank clerks and tellers
Bill collectors
Bookkeepers
Business machine operators, offices
Claims examiners
Clerical or stenographic
Conductors, RR
Factory storekeepers
Factory supervisors
Post office clerks
Route managers
Sales clerks
Sergeants and petty officers, military services
Shipping clerks
Supervisors, utilities, factories
Supervisors, toll stations
Warehouse clerks

B. Technicians

Dental technicians
Draftsmen
Driving teachers
Expeditor, factory
Experimental tester
Instructors, telephone co., factory
Inspectors, weights, sanitary, RR, factory
Investigators
Laboratory technicians
Locomotive engineers
Operators, P.B.X.
Proofreaders
Safety supervisors
Supervisors of maintenance
Technical assistants
Telephone company supervisors
Timekeepers
Tower operators, RR
Truck dispatchers
Window trimmers (stores)

C. Owners of Little Businesses ($3,000-$5,000)

Flower shop
Grocery
Newstand
Tailor shop

D. Farmers

Owners ($10,000-$20,000)

5. Skilled Manual Employees

Auto body repairers
Bakers
Barbers
Blacksmiths
Bookbinders
Boilermakers
Brakemen, RR
Brewers
Bulldozer operators
Butchers
Cabinet makers
Cable splicers
Carpenters
Casters (founders)
Cement finishers
Cheese makers
Chefs
Compositors
Diemakers
Diesel shovel operators
Electricians
Engravers
Exterminators
Fitters, gas, steam
Firemen, city
Firemen, RR
Foremen, construction, dairy
Gardners, landscape (trained)
Glass blowers
Glaziers
Gunsmiths
Gauge makers
Hair stylists
Heat treaters
Horticulturists
Linemen, utility
Linotype operators
Lithographers
Locksmiths
Loom fixers
Machinists (trained)
Maintenance foremen
Linoleum Layers (trained)
Masons
Masseurs
Mechanics (trained)
Millwrights
Moulders (trained)
Painters
Paperhangers
Patrolmen, RR
Pattern and model makers
Piano builders
Piano tuners
Plumbers
Policemen, city
Postmen
Printers
Radio, TV maintenance
Diesel engine repair and maintenance (trained)
Repairmen, home appliances
Rope splicers
Sheetmetal workers (trained)
Shipsmiths
Shoe repairmen (trained)
Stationary engineers (licensed)
Stewards, club
Switchmen, RR
Tailors (trained)
Teletype operators
Tool makers
Track supervisors, RR
Tractor-trailer trans
Typographers
Upholsterers (trained)
Watchmakers
Weavers
Welders
Yard supervisors, RR

Small Farmers

Owners (under $10,000)

Tenants who own farm equipment

6. Machine Operators and Semi-skilled Employees

Aides, hospital
Apprentices, electricians, printers, steam fitters, toolmakers
Assembly line workers
Bartenders
Bingo tenders
Bridge tenders
Building superintendents (Construction)
Bus drivers
Checkers
Coin machine fillers
Cooks, short order
Deliverymen
Dressmakers, machine
Elevator operators
Enlisted men, military services
Filers, sanders, buffers
Foundry workers
Garage and gas station attendants
Greenhouse workers
Guards, doorkeepers, watchmen
Hairdressers
Housekeepers
Meat cutters and packers
Meter readers
Operators, factory machines
Oilers, RR
Practical nurses
Pressers, clothing
Pump operators
Receivers and checkers
Roofers
Set-up men, factories
Shapers
Signalmen, RR
Solderers, factory
Sprayers, paint
Steelworkers (not skilled)
Stranders, wire machines
Strippers, rubber factory
Taxi drivers
Testers
Timers
Tire moulders
Trainmen, RR
Truck drivers, general
Waiters-waitresses ("Better Places")
Weighers
Welders, spot
Winders, machine
Wiredrawers, machine
Wine bottlers
Wood workers, machine
Wrappers, stores and factories

Farmers

Smaller tenants who own little equipment

7. Unskilled Employees

Amusement park workers (bowling alleys, pool rooms)
Ash removers
Attendants, parking lots
Cafeteria workers
Car cleaners, RR
Carriers, coal
Countermen

7. Unskilled Employees (continued)

Dairy workers
Deck hands
Domestics
Farm helpers
Fishermen (clam diggers)
Freight handlers
Garbage collectors
Grave diggers
Hod carrier
Hog killers
Hospital workers, unspecified
Hostlers, RR
Janitors (sweepers)
Laborers, construction
Laborers, unspecified
Laundry workers
Messengers

Relief, public, private

Farmers--share croppers

Platform men, RR
Peddlers
Porters
Roofer's helpers
Shirt folders
Shoe shiners
Sorters, rag and salvage
Stage hands
Stevedores
Stock handlers
Street cleaners
Unskilled factory workers
Struckmen, RR
Waitresses ("Hash Houses")
Washers, cars
Window cleaners
Woodchoppers

Unemployed (no occupation)

# ARITHMETIC SKILLS

Work each of the following problems and select the answer you believe to be correct from the choices given.

____ 1. 9658 +3467 — a) 14225, b) 13125, c) 12101115, d) 12126, e) none of these.

____ 2. 50 376 841 +4720 — a) 41987, b) 4867, c) 418187, d) 5087, e) none of these.

____ 3. 7 + 312 + 53 + 168 = — a) 360, b) 638, c) 450, d) 540, e) none of these.

____ 4. 52.4 + 36 + 7.18 + 81 = — a) 134.9, b) 241.2, c) 146.22, d) 176.58, e) none of these.

Subtraction:

____ 5. 45386 -21265 — a) 66651, b) 24121, c) 23131, d) 23212, e) none of these.

____ 6. 6427 -4319 — a) 2112, b) 10746, c) 2118, d) 2101, e) none of these.

____ 7. 75 -46 — a) 29, b) 39, c) 121, d) 31, e) none of these

Multiplication:

____ 8. 7264 x 6 — a) 48620, b) 43584, c) 43470, d) 48364, e) none of these.

____ 9. 36 x 47 — a) 1622, b) 1242, c) 2323, d) 1692, e) none of these.

____10. 2.46 x 3 — a) 73.8, b) 73800, c) 738, d) .738 e) none of these.

____11. 3.842 x 6.4 — a) .235888, b) 23.5888, c) 2358880. d) 24.5888, e) none of these.

Division:

____12. $6\overline{)3204}$ a) 524, b) 504, c) 541, d) 501, e) none of these.

____13. $4\overline{)180300}$ a) 40070, b) 45074, c) 45065 d) 40570, e) none of these.

____14. "6 into .6" is written a) $6\overline{)6}$, b) $6\overline{).6}$ c) $.6\overline{)6}$ d) $6 \div .6$, e) none of these

____15. "25 into 5" is written a) $5\overline{)25}$, b) $25 \div 5$, c) $25\overline{)50}$ d) $25\overline{)5}$, e) none of these.

Write equivalent numerals for #16 through #21

____16. $1 = \frac{\quad}{8}$ a) 1, b) 4, c) 8, d) 9, e) none of these.

____17. $4 = \frac{\quad}{5}$ a) 1, b) 5, c) 9, d) 20, e) none of these

____18. $3\frac{1}{4} = \frac{\quad}{4}$ a) 7, b) 8, c) 12, d) 31, e) none of these.

____19. $6 = \frac{\quad}{8}$ a) 65, b) 53, c) 19, d) 11, e) none of these

____20. .07 = ___% a) .7, b) 7, c) 70, d) 700, e) none of these

____21. .3 + ___% a) .03, b) .3, c) 3, d) 30, e) none of these

____22. Write 9% as a decimal. a) 9, b) .9, c) .09, d) .009, e) none of these

____23. Write 225% as a decimal. a) 2.25, b) 22.5, c) .225, d) .0225, e) none of these

____24. 5% of 240 is a) 10, b) 24, c) 48, d) 15, e) none of these

____25. 32% of 75 is a) 12, b) 24, c) 48, d) 120, e) none of these.

____26. 40 is 16% of a) 64, b) 640, c) 240, d) 250, e) none of these

____ 27. Write .25% as a decimal a) .0025, b) .025, c) .25, d) 25, e) none of these

____ 28. Write 3/4% as a decimal a) 7.5, b) .75, c) .075, d) .0075, e) none of these

____ 29. Write 25% as a decimal a) .0025, b) .025, c) 2.5, d) .0075, e) none of these

____ 30. 28 is what % of 42? a) 50, b) 62½, c) 66-2/3, d) 75, e) none of these

____ 31. If a certain pair of shoes cost $10.00 last year and if the price rose 6% since then, the shoes now cost
a) $.60, b) $16.66, c) $10.60, d) $60.00, e) none of these

____ 32. The average of 25, 30, 45, 20, and 40 is
a) 80, b) 32, c) 160, d) 30, e) none of these

____ 33. The average of 23, 36, 42, 52, and 27 is
a) 36, b) 90, c) 35, d) 179, e) none of these

____ 34. Round 13-1/3 to the nearest whole number
a) 13, b) 14, c) 13-1/3, d) 15, e) none of these

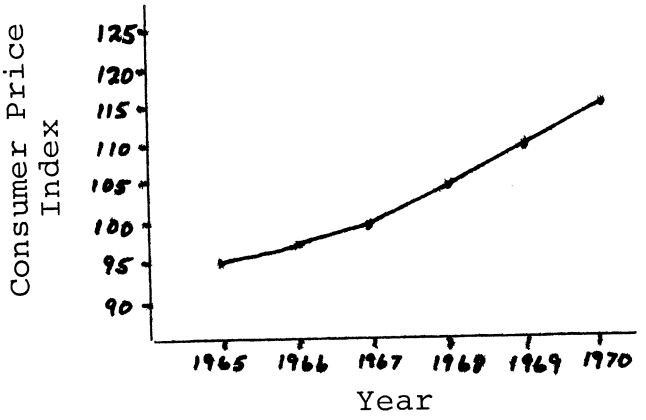
____ 35. Round 14.8 to the nearest whole number
a) 16, b) 14, c) 14.8, d) 15, e) none of these

____ 36. Round 21-5/6 to the nearest whole number
a) 20, b) 21, c) 22, d) 21-5/6, e) none of these

____ 37. Round 104.1 to the nearest whole number
a) 104, b) 105, c) 100, d) 104, e) none of these

____ 38. Given the graph below in which the Consumer Price Index is plotted against the years 1965 to 1970, answer the following question:

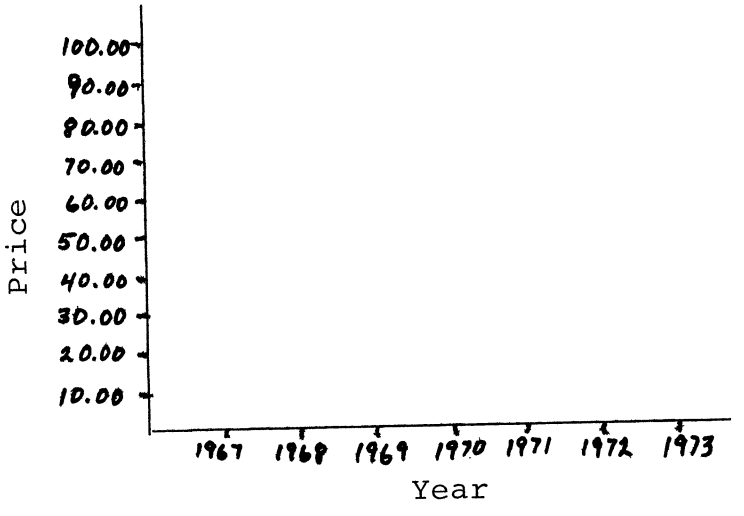
What was the Consumer Price Index in 1968?
a) 95, b) 105, c) 110, d) 115, e) none of these




____ 39. Use the graph above to answer the following question:
What was the trend in the Consumer Price Index for the years 1965 through 1970?
a) increasing, b) decreasing, c) about the same, d) the graph doesn't contain enough information to determine this, e) none of these

____ 40. Graph the information in the chart on the axes provided below and connect the points with line segments:

| Price of radios produced by the Widget Manufacturing Company | Year |
|---|---|
| 20.00 | 1967 |
| 35.00 | 1968 |
| 40.00 | 1969 |
| 55.00 | 1970 |
| 70.00 | 1971 |
| 50.00 | 1972 |



# ECONOMIC CONCEPTS

Answer each of the following questions. Select the answer you believe to be correct from the choices given.

____ 1. The Consumer Price Index measures changes in
a) the prices of goods and services
b) the prices of eggs only
c) the house values after taxes
d) the cost of taxes only

____ 2. The Consumer Price Index is
a) the average income after taxes of a single person
b) price changes from one store to another
c) the measure of changes in prices of goods and services
d) a list of prices posted in stores

____ 3. Real income is
a) your total salary after cashing a check
b) how much money you have when you cash your check at the bank
c) how much you can buy with your income
d) how much you can spend after you pay your bills

____ 4. The Consumer Price Index affects
a) your purchasing power
b) the size of a bank
c) how much gold is in Fort Knox
d) how much money is printed

____ 5. If the price index changes from 105 to 111, the effect is
a) no change in the amount you will be able to buy
b) you will be able to buy more with the same amount of money
c) you will be able to buy less with the same amount of money
d) you will be given a bonus of $6.00 off your income tax

____ 6. The Consumer Price Index has changed significantly since 1971 because we are in a period of
a) inflation
b) deflation
c) strife
d) none of the above

____ 7. The base period for an index is 100. If the index 116 precedes this base period, then there was
a) an increase of 16% in prices
b) a decrease of 16% in prices
c) no real change in prices that the consumer would notice
d) an increase of 16¢ on every item purchased

____ 8. If last year's index of prices was 100 and prices have risen 30% this year, then the new price index would be
a) 70
b) 130
c) 30
d) 100

____ 9. The BLS is
a) Bureau of Legal Statistics
b) Baseball League of the South
c) Bureau of Labor Statistics
d) Bowling League of the South

____ 10. The data for the Consumer Price Index are gathered by
a) checking prices in a nearby store
b) checking prices in all stores in Washington, D.C.
c) Checking prices at some representative businesses
d) gathering prices from all the business in the United States

____ 11. Inflation means
a) a price freeze
b) a rise in prices
c) a decrease in prices
d) stable prices

____ 12. What government organization is in charge of the data collection and calculations for the Consumer Price Index?
a) the Department of Commerce
b) the Federal Bureau of Investigation
c) a Certified Public Accountant
d) the Bureau of Labor Statistics

____ 13. The Consumer Price Index can be relied on as an indicator of general price levels
a) always
b) nearly always
c) sometimes
d) never

____ 14. Given the following information, compute the price index for Year 2 for a baseball bat.

| Year 1 | Year 2 |
|---|---|
| $2 | $3 |

The price index for Year 2 is:
a) $1
b) 150
c) 1-1/3
d) 6

____ 15. Given the following information, compute the price index for Year 2 in which all three items are included.

| | Year 1 | Year 2 |
|---|---|---|
| watch | $15 | $19 |
| doctor's bill | 12 | 15 |
| shoes | 13 | 16 |

The price index for Year 2 is
a) 50
b) 133
c) 125
d) 10

Name _____

Arithmetic Skills

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Economic Skills

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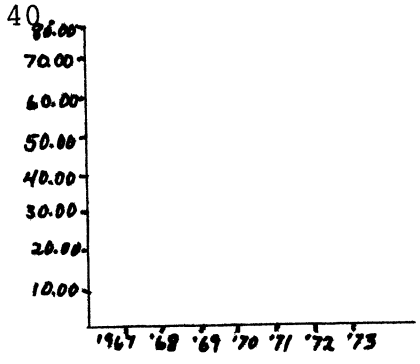
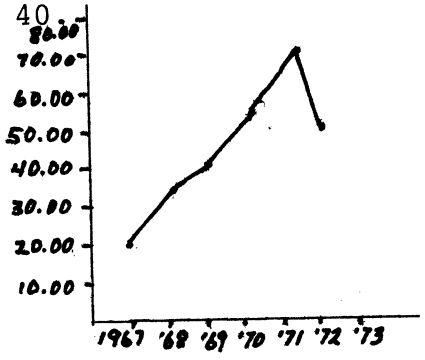


# ANSWER KEY

## Arithmetic Skills

1. b
2. e
3. d
4. d
5. b
6. e
7. a
8. b
9. d
10. e
11. d
12. e
13. e
14. b
15. d
16. c
17. d
18. e
19. e
20. b
21. d
22. c
23. a
24. e
25. b
26. e
27. a
28. d
29. e
30. c
31. c
32. b
33. a
34. a
35. d
36. c
37. a
38. b
39. a
40.




## Economic Skills

1. a
2. c
3. c
4. a
5. c
6. a
7. b
8. b
9. c
10. d
11. b
12. d
13. a
14. b
15. c

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