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A COMPARISON OF INDUCTIVE AND DEDUCTIVE MATERIALS FOR TEACHING ECONOMIC CONCEPTS TO CULTURALLY DISADVANTAGED CHILDREN.

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New curricular materials were used to ascertain whether inductive or deductive teaching methods would yield significant differences in learning economic concepts. A total of 484 disadvantaged fourth-grade students were assigned on a random stratified basis to classes in which the economics units were taught by one of the two methods. Data were gathered by pretesting and posttesting on the economics units and by measures of race, sex, socioeconomic status, intelligence, and ratings of teachers and their competency in the subject. Statistical analysis showed that the inductive method "was consistently more effective than the deductive method with all disadvantaged subjects in the study." (NH)

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Statement of the Problem

The purpose of the study was to discover whether the inductive and deductive materials used by elementary school teachers to teach economic concepts would result in significantly different gains in culturally disadvantaged fourth grade students. Collection and dissemination of this data could be useful in the classroom where the teacher has normally experienced difficulty in teaching the low achieving, disadvantaged student.

Review of the Literature

Research in teaching the social studies to the disadvantaged does not compare with a discipline such as reading. Quality and quantity have a deficit by comparison.

Robison and Mujerki (1966) were successful in teaching social science concepts to kindergarten students in a New York City School. These researchers concentrated on a unit Air Transport for a seven months period. A pre- and post-test of 18 items was utilized and gain scores were significant at the .0005 ($P < .0005$) confidence level.

Boocock (1967) reported excellent results with the use of games and simulation in teaching the Game of Democracy (Coleman, 1966) to culturally deprived students in Baltimore, Maryland secondary grades.

Rader (1967) reports significant gains in teaching economics to elementary students in Michigan schools.

Comparison studies of inductively written material versus deductively written materials in the social studies are limited, also. Poissen (1964) investigated the effects of three teaching methodologies on development of problem

solving skills of sixth grade children. Method A used a process of searching and self-discovery. Method B used a deductive process where simple facts and generalizations were told by the teacher with subsequent role learning by the teacher. Method C was deductive in nature but detailed explanations of the causal relationships underlying the concepts were added to the lesson plans. Results of the study showed that "students trained in the use of inductive procedures exhibit some characteristics of effective problem-solving behavior more frequently than pupils taught by the deductive method." Results were significant at the .05 ($P < .05$) confidence level.

Craik (1967), Ribble (1966), Gagnon (1966), and Grannis (1966) confirm the efficacy of the inductive method versus the deductive method. Their subjects were normal rather than deprived.

Reese (1967) compared single concept science films using the inductive and deductive methods with 1670 sixth grade children in Alberta Province, Canada. Greater total gains were scored through use of the deductive film than the inductive film; however, boys did better with the inductive method while girls did better with the deductive method. Blake (1967) concluded that intensive presentation of concepts to subjects in three intelligence categories from high to low resulted in higher achievement scores for subjects receiving the deductive treatment.

While a majority of the studies are concerned with normal subjects and methodologies, it would seem there exist reasonable evidence for expected success in either inductively or deductively written materials.

Method and Approach Used in the Study

Extant materials available from commercial sources were selected for the study. A readability formula and concept presentation were used to match material for content and appropriate grade level. An Economics unit Elementary Economics I

and Our Working World--Cities At Work (pages 103-181) were used for instructional material. Analysis of the method of material presentation showed the first utilized the inductive method while the latter utilized the deductive method. The intensions of the respective authors was not a subject of this investigation.

Subjects were selected from schools denoted as eligible for specials funds because of the economic status of a majority of the students' families. A majority of the families had incomes below $3,000.

A population of 484 students in eighteen fourth grade classes was selected. Classes were assigned to one of the units on a stratified random basis. Teacher efficiency ratings were utilized in assignment to insure that all teachers rated on the low end of a poor to excellent continuum were not assigned the same unit.

Pre- and post-tests were administered on the first and last days, respectively. A daily 40 minute instructional period was used for 28 days.

Teacher in-service was restricted to a two hour period for introduction to the material.

Evaluation instrument development preceded the regular investigation. A 90 item pilot test was administered to students outside the study who were using economic materials at the same grade level. Item discrimination data were used to select 55 items for the final form of the instrument.

Results of the Study

Pre-test statistical data were analyzed by use of the Test Scorer and Statistical Analysis Program 2 (Wolf and Klopler, 1963). A Kuder-Richardson Formula 20 reliability coefficient of .87 was obtained. Item discrimination values were acceptable ($P > .05$, $P < .95$). Table I gives pre-test data.

A Kuder-Richardson reliability coefficient of .88 was computed for the post-test. Table II gives post-test data.

Socio-economic data on students' family were collected and an Index of Social Position was derived (Hollingshead and Redlich, 1958). The California Short Form Test of Mental Maturity, S-Form, Level 2, 1963 (Sullivan, et al., 1963) was used to determine IQ.

A Teacher Rating Scale was used to rate teacher attitude and skills. These ratings were made by curriculum directors in the respective school systems after they had rated an 'ideal' teacher. An ideal teacher's rating was determined by aggregating the models and individual teachers were rated from this norm.

A priori teacher competency in economics was assessed by use of a 75 item Basic Test of Economics (Wallace, 1965). Kuder-Richardson Formula 20 reliability coefficient of .87 was computed for this instrument when used with University of Georgia students enrolled in their first course of economics.

A variance analysis linear regression model was utilized in data analysis. A Duncan Multiple Range Test for the three main effects was set at the .05 ($P < .05$) confidence level. Table III presents the results of the variance analysis for scores on the post-test. Main effects and interactions were analyzed for F-values.

Main effects used in the analysis were (1) sex, (2) race, and (3) program. First order interactions were (1) sex X race, (2) sex X program, and (3) race X program. A second order interaction was sex X race X program. Covariates used were (1) economics pre-test scores, (2) language IQ, (3) non-language IQ, (4) total IQ, (5) social index, (6) teacher race, (7) teacher sex, (8) teacher education, (9) teacher's score on Test of Basic Economics, (10) teacher attitude rating, and (11) teacher skills rating.

Table III shows results of variance analysis. Main effect race (F-value 16.574, df 1) was significant at the .01 ($P < .01$) confidence level. Main effect program (F-value 79.741, df 1) was significant at the .01 ($P < .01$) confidence level. Main effect sex (F-value 1.978, df 1) was non-significant.

First order interactions were significant at the .01 ($P < .01$) confidence level.

Covariates pre-test, language IQ, social position index, and teacher education were significant at the .01 ($P < .01$) confidence level. Non-language IQ, total IQ, teacher sex, teachers' score on Test of Basic Economics and Teacher Attitude Rating were significant at the .05 level ($P < .05$) confidence level.

Program materials were compared at the .05 ($P < .01$) confidence level and the inductively written material was significantly more efficacious than the deductively written program material. Table IV shows the above comparison.

Conclusions

Results of this study indicate that some effect on learning may accrue from the method in which economic materials are written for culturally disadvantaged fourth grade subjects. Materials utilizing the inductive method, when compared with materials using the deductive method, may enable subjects to achieve significantly higher gain scores. Authors should consider methodology used in writing materials for this population and employ the inductive methodology where possible.

Table I

TEST STATISTICS FOR ECONOMICS PRE-TEST

	Pre-test
Mean raw score	26.44
Standard error of the mean	0.40
Standard deviation	8.96
Standard error of deviation	0.26
Skewness	-0.25
Standard error of skewness	0.11
Kurtosis	-0.24
Standard error of kurtosis	0.21
Number of subjects	516
Test reliability coefficient (KR20)	0.87
Validity coefficient	0.66

Table II

TEST STATISTICS FOR ECONOMICS POST-TEST

	Pre-test
Mean raw score	32.10
Standard error of the mean	0.44
Standard deviation	9.59
Standard error of deviation	0.23
Skewness	-0.20
Standard error of skewness	0.11
Kurtosis	0.87
Standard error of kurtosis	0.22
Number of subjects	507
Test reliability coefficient (KR20)	0.88
Validity coefficient	0.64

Table III

ANALYSIS OF VARIANCE FOR SCORES ON

ECONOMICS POST-TEST FOR GRADE 4 STUDY PUPILS

Source of Variance	Degree of freedom	Sums of Squares	Mean Squares	F
Model	18	38,347.70	2,130.43	82.45
Error	488	12,609.62	25.84	
Sex	1	51.12	51.12	1.98
Race	1	428.27	428.27	16.57
Program	1	2,060.46	2,060.46	79.74
Sex x Race	1	162.74	162.74	6.30
Sex x Program	1	313.68		12.14
Race x Program	1	1,023.68	1,023.69	39.62
Sex x Race x Program	1	57.07	57.07	2.21
Economics Pre-Test	1	3,206.42	3,206.42	124.09
Language IQ	1	1,002.69	1,002.64	38.81
Non-Language IQ	1	86.17	86.17	3.34
Total IQ	1	84.77	84.77	3.28
Socio-Economic Index	1	380.48	380.48	14.73
Teacher	1	21.51	21.51	.83
Teacher Education	1	359.30	359.30	13.91
Teacher Score on Test of Basic Economics	1	109.88	109.88	4.25
Teacher Attitude Rating	1	113.76	113.76	4.40
Teacher Skills Rating	1	17.77	17.77	0.69

Table IV

DUNCAN MULTIPLE RANGE TEST AT 5 PERCENT LEVEL FOR THREE MAIN EFFECTS

Sex	Constant	SE of Constant	Mean	Homogeneous with
Male	.437895E	.311317E	35.1113E	2
Female	-.437895E	.311317E	34.2355E	1
Race				
Negro	4.82699E	1.1856E	39.5004E	Itself only
Caucasian	-4.82699E	1.18565E	29.8464E	Itself only
Program				
Rader	5.51353E	.617432E	40.1869E	Itself only
Senesh	-5.51353E	.617432E	29.1599E	Itself only

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