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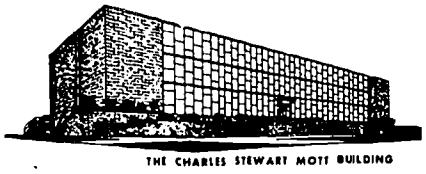
ABSTRACT

There is a growing awareness of the need to include economics as a subject in the elementary school curriculum. This research project directed by the Industrial Relations Center of The University of Chicago demonstrates that variable economic understanding in students occurs at each socioeconomic status (SES) level. Included in the study is an investigation of the effect of teacher acquaintance with the materials on student learning of the economics program. The chosen program of study, Economic Man, focuses on the economic concept of exchange. Testing instruments are described and results of the tests of economic understanding are included. Conclusions are drawn as to the effectiveness of the program and the correlation of learning with teacher acquaintance with the materials. A related document is ED 064 186. (SHM)

TEACHING ECONOMICS IN ELEMENTARY SCHOOLS:
Comparing Program Vs. Non-Program Students and the Effect of Teacher Acquaintance with Instructional Materials

Robert W. Pranis



ELEMENTARY ECONOMICS PROJECT

INDUSTRIAL RELATIONS CENTER / THE UNIVERSITY OF CHICAGO

TEACHING ECONOMICS IN ELEMENTARY SCHOOLS: Comparing Program Vs. Non-Program Students and the Effect of Teacher Acquaintance with Instructional Materials

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Little evaluation research has been done to date in the field of economic education. Although this can also be said to be somewhat true in the field of education generally, it seems of particular import for economic education because of a growing awareness of the need to include economics as a subject in the elementary school curriculum.

The Industrial Relations Center of The University of Chicago (IRC) has been developing economics programs for elementary schools for a number of years.[1] In addition to the writing of instructional materials for the program, considerable effort is devoted to the development of pre- and post-tests of economic understanding.

It is common in educational research to take advantage of data gathered during test development to throw light on some questions which, ordinarily, would not be investigated until the test development was complete. During the third year of field testing its sixth grade program in economics,[2] the Industrial Relations Center took advantage of such an opportunity.

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*The author is indebted to William D. Rader, James R. Murray, and Howard A. Sulkin of the Industrial Relations Center for their suggestions on this paper.

[1]This research and development effort has been funded by the Charles Stewart Mott Foundation of Flint, Michigan.

[2]The Industrial Relations Center, The University of Chicago, Economic Man (Westchester, Illinois: Benefic Press, 1970). The research editions of this program were called Elementary Economics III: Exchange.

Research Focus

A recurring research concern of the IRC has been to demonstrate significant increase in economic understanding in students from various socioeconomic status (SES) communities. Using the pre-post tests, it was decided to demonstrate that learning took place at each SES level. There were two factors to be considered in determining whether an increase in economic understanding took place. One, some evidence existed that, at a given grade level, the rate of change was greater in some SES levels than in other levels. Two, students who initially helped pilot test this program tended to be from upper and middle class suburbs. It was decided not to compare the amount of the learning among the various SES students since a wealth of existing evidence indicated that, in general, the higher the SES level the higher would be the indices of learning.[3]

Another research concern of the IRC has to do with the effect on student learning of teacher familiarity with the materials. Among the many barriers to innovation in the school curriculum is the seemingly natural reluctance of teachers to teach a subject about which they feel they know little. Not the least threatening of these subjects is economics.

An increasing number of articles and reports point to the desirability and need for economic education in schools.[4] Although a number of teachers with course and workshop training are teaching economics at the high school level, few elementary teachers have training in economics. In fact, the typical elementary school teacher's exposure to economics as a discipline is a semester or two in college—and that several years ago.

The effect of this lack of training in economics by elementary teachers was observed recently in planning a field test of the sixth grade program. A number of sixth grade teachers were asked if they would be willing to teach the program to their students. Quite often the initial reaction was one of reluctance. The teachers pointed out that they would not be good teachers for this program since they knew little about economics, and they were unfamiliar with the materials.

A much higher degree of acceptance was received when the teachers were offered one day of in-service training before starting to teach the program. In-service training consisted of one or more members of the program development staff meeting with the teachers and going over all of the materials, explaining the rationale of the various lessons, leading the teachers through a simulation game,

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[3] For example, N. L. Gage, ed., Handbook of Research on Teaching (Chicago: Rand McNally and Company, 1963), p. 739.

[4] One of the most important of these is Report of National Task Force on Economic Education, Economic Education in the Schools (New York: Committee for Economic Development, September, 1961).

clarifying certain economic concepts and answering any questions the teachers may have had. At the end of the school year, most of the teachers who taught the program reported that the program had been successful and that they were very pleased to have participated.

It was realized, however, that economically and logistically, mass in-service training would be impossible once the program was out of the field-test stage and on the market. For purposes of this study, then, it was decided to investigate the effect of teacher acquaintance with the materials on student learning of the economics program.

The Design and Sample

Teachers who had acquired a year's experience with the materials from the previous year's field test were asked to teach the program another year. Two new groups of teachers were also chosen. One group would receive the materials and one day of in-service training; the other group would receive the materials but no training. Both new groups would then be asked to teach the program to their students.

Experienced Teachers

Twenty teachers who had taught the program in the previous year were available to participate in the study. In each system where the program was field tested, a contact person (superintendent, assistant superintendent, curriculum director, social studies director or principal) obtained the cooperation of their teachers. The teachers contacted were usually those who the contact person thought would be interested in and willing to innovate a new program.

The contact person was asked to select teachers from schools in high, middle and low socioeconomic neighborhoods. Each contact person was asked to use his own judgment in making the SES designations. Some contact people expressed discomfort at making these judgments. No attempt was made to get a second opinion of the designations.

From the previous year's list of experienced teachers, five teachers were randomly selected from each of the three socioeconomic levels. Letters were sent to these fifteen teachers asking if they would again be willing to teach the program. Only one teacher declined to participate as she was involved in another social studies project under a Title I grant. Another teacher fell ill in the middle of the program and her class was dropped from the study.

In-Service Trained and Non-In-Service Trained Teachers

Six additional school systems agreed to allow their teachers to participate in this field test. This time, instead of asking the contact person to select the teach-

ers, each contact person was asked to submit a list of all available sixth grade teachers and an indication of the socioeconomic level of each school. Again, the SES designation was up to the contact person.

Using a table of random numbers, teachers were randomly chosen from each contact's list to fill our need of program teachers. Because of the expense of in-service training, it was decided to have all of the selected teachers in three school systems receive the training rather than to try to train a select few in all six systems. All of the teachers in any given school system received in-service training at the same time.

The random and non-random aspects of this selection process should be kept clear. The systems involved in the field test were selected on the basis of availability, although an attempt was made to draw them from differing geographic areas of the nation. Participating schools were located in California, Connecticut, Illinois, Michigan, Minnesota, and Texas. For the in-service and non-in-service sample, a list of available teachers was obtained from each system. The contact person in each system indicated for each school whether, in his opinion, it was in a high, middle, or low socioeconomic neighborhood. Teachers were then randomly chosen from these lists and were asked if they would be willing to teach the program to their class. If the teacher declined the request, another teacher from that system was randomly selected. Of the six systems, three were randomly chosen to have their teachers receive the in-service training.

When new classroom materials are being evaluated, a possible source of bias is the attitude of the teacher who volunteers to try them out with her class. The eager volunteer teacher may transmit this eagerness to her students. Under these conditions, any kind of program could be successful. In this study, random selection of the new program teachers was used to minimize the effect of the overly eager teacher.

Because the teachers who taught the program in the previous year were not selected by the process just described, the experienced teacher group is more likely to contain the eager volunteers.

Control Teachers

After the program teachers were selected from the list of available teachers, the control teachers were randomly selected from those remaining on the list. The selection process was similar to that described above with one exception. When a teacher declined to teach the program she was kept on the list as an available control teacher. One of the control teachers asked that both of her social studies classes go through the same experience, i.e., receive the pre- and post-tests. Thus, we had one more control class than the design called for. The number of classes and their designation is shown in Table 1.

TABLE 1
The Number and Types of Classes in the Study

Socio-Economic Level	Classes of Experienced Teachers	Classes of In-Service Trained Teachers	Classes of Non-In-Service Trained Teachers	Total Classes Receiving Program	Control Classes
High	5	6	6	17	6
Middle	6	5	6	17	5
Low	3	5	5	13	5
Total	14	16	17	47	16

The Program

The Economic Man program was developed by the IRC over a period of five years. The program focuses on the economic concept of exchange and requires 40 minutes teaching time a day, five days a week for 21 weeks. The program contains three units of 8, 5, and 8 weeks.

Unit I concerns a young man who is shipwrecked on a deserted tropical island. There he has to make economic decisions about how to spend his time and how to take advantage of the island's resources. Later, others are shipwrecked on the island and specialization and division of labor develop. There are many opportunities for students to engage in role playing, team activities, and arts and crafts. Some teachers report that students who are ordinarily "dull" in social studies often become actively interested in Unit I.

Unit II is built around a simulation game called MARKET. The class is divided into retailer and consumer teams. Each retailer-team sells to the consumers and tries to make the largest profit. Consumer teams circulate among the retailers, search for the most competitive prices and attempt to satisfy dinner meal requirements with a limited amount of money. There is much moving about and interaction of the students during the game. This unit involves price theory and the determination of a market clearing price from supply and demand lines. Unit III concerns

problems in international trade and introduces graph reading. On the whole, the program was developed to contain something to interest a wide variety of students.

The Testing Instruments

Economics Tests

Tests of general economic understanding were not available at the sixth grade level. The closest available test of general economic knowledge was designed for the 12th grade.[5] Tests had been developed by the IRC to be used with its programs for the 4th and 5th grades, but these tests were judged to be too definitional and too program-specific for purposes of this study.

The tests used in this study were the third versions of the instruments developed to measure the economic understanding learned in the sixth grade program. The items in these tests were designed to tap each of the important knowledge concepts, generalizations and main ideas in the program. Although a vocabulary knowledge component exists in some of the items, an effort was made to construct items which contained a higher level of cognition rather than items of a definitional nature only. Based upon Bloom's Taxonomy,[6] it is believed that a large number of the items are at least at level four—analysis.

The tests consist of multiple-choice items and are untimed. For the pre-test, 62 items were developed which covered most of what the authors of the program judged important. For the post-test, a smaller number of different items were developed (56 items) which also covered the important parts of the program. Little attempt was made to match all items as to either content or form; this was done, however, when possible.

Intelligence Tests

A variable that should be considered in this type of research is intelligence, i.e., whether differences in classroom scores on the pre-post tests may have been due to a significant difference in the intelligence level of the children in each class. Although it would not be surprising if classes of students from different SES levels were to score differently on the pre-post tests, it can be expected that classes of students from the same SES level, chosen randomly, would score similarly on these tests.

The Otis-Lennon Test of Mental Ability (Form K) was selected to be administered to all children in the study to ensure that the different treatment groups at the

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[5] Committee for Measurement of Economic Understanding, Test of Economic Understanding (Chicago: Science Research Associates, 1963).

[6] B. Bloom, ed., Taxonomy of Educational Objectives: Cognitive Domain (New York: David McKay Company, Inc. 1956).

same SES level did not differ in intelligence. This test consists of 30 items and is timed for 40 minutes.

The intelligence tests and the pre-tests were administered by the teachers in January 1969. The post-tests were administered at the end of the school year. For most schools this was in the first or second week of June 1969.

Results

Only students who had both pre- and post-tests of economic understanding are included in this study. All but 12 of these students took the intelligence tests. Unless otherwise noted, the results for the economic tests are reported in terms of percent of number of items. The intelligence test results are reported as raw scores.

Reliability of Economics Tests

Table 2 shows the raw score means and standard deviations (S.D.) for all program and control students for both the pre- and post-tests with KR-20 reliability estimates.

TABLE 2
Means, Standard Deviations, and Reliabilities of Pre- and Post-Tests

Program Students	Pre-Test	Post-Test
N=1229		
Mean	36.41	45.61
S.D.	10.61	13.89
r_{tt} (K-R 20)	.71	.81
Control Students		
N=440		
Mean	34.73	35.32
S.D.	9.68	10.52
r_{tt} (K-R 20)	.65	.67

It was expected that the highest reliability estimate in the post-test would be for students who had taken the program. In the other three testing situations, the students would be more likely to guess at the right answers which would increase the error variance of the test and reduce the reliability. Such a difference in pre-test reliability between the program and control students was not expected. Since differences were found, however, one could speculate that the program teachers let it be known that the pre-test was part of a new program which the students were

about to start. The control teachers could have found it difficult to justify the reason for taking the test to their classes.

The Intelligence Test Results

Table 3 shows the average raw scores and standard deviations on the Otis-Lennon Intelligence Test for each of the groups used in this study.[7]

TABLE 3
Intelligence Test Scores

SES		Experienced	Trained	Non-Trained	Controls
HIGH		N=126	N=170	N=162	N=150
	Mean	62.05	60.78	63.12	62.95
	S.D.	11.71	13.07	11.38	7.95
MIDDLE		N=155	N=128	N=159	N=154
	Mean	58.82	61.02	59.73	61.77
	S.D.	13.35	12.33	13.47	10.69
LOW		N=76	N=111	N=130	N=131
	Mean	50.34	43.13	45.04	46.15
	S.D.	15.24	16.31	15.28	15.23

While no significant differences were expected within any SES level, three such differences occurred. In the higher SES level there are no significant differences between the groups. In the middle SES level the students with experienced teachers were 2.95 raw score points lower than control students. This results in a T of 2.14 which is significant beyond the .05 level of confidence. In the low SES level, students with experienced teachers were significantly higher than the other two program groups. Students with experienced teachers were 7.22 points higher than those with in-service trained teachers ($T=3.07$; $p < .01$). They were 5.30 points higher than those with no in-service training ($T=2.40$; $p < .05$).

Program Compared to Control Students

The first aim of this study was to show that students at all socioeconomic levels taking the program evidenced greater learning in economics than comparable control students. Some gain from pre- to post-tests with the control students is expected, however, because of factors such as an increase in reading ability. Since

[7] The IQ equivalence for Otis-Lennon test results is based on age to the nearest three months. This age data was not obtained in this study.

the control teachers had no previous acquaintance with the program, the most meaningful groups of students for comparison would be program students whose teachers also had no previous acquaintance with the program.

Table 4 shows the pre- and post-tests results for these groups. The figures are given in percent of total number of items—62 items for the pre-test and 56 items for the post-test.

TABLE 4
Means, Standard Deviations and Correlations Between Pre- and Post-Test Taken by Program and Control Students of Different SES Levels Whose Teachers Had No Previous Acquaintance with the Program Materials

SES		Program Students		Control Students	
		Pre	Post	Pre	Post
HIGH		N=164		N=152	
	Mean	38.62	49.31	36.65	37.49
	S.D.	9.40	12.26	9.43	11.00
	$r_{(pre\text{-}post)}$	.65		.47	
MIDDLE		N=159		N=156	
	Mean	39.15	48.23	36.66	36.10
	S.D.	9.83	12.94	9.94	10.94
	$r_{(pre\text{-}post)}$	.61		.69	
LOW		N=134		N=132	
	Mean	29.95	34.83	30.22	31.93
	S.D.	8.91	9.87	7.93	8.35
	$r_{(pre\text{-}post)}$	.49		.46	

The pre-post gains in Table 4 are easier to identify if graphed as in Fig. 1. The most striking data in Fig. 1 is the large gain from pre- to post-tests of the program groups compared with the control groups. At each of the SES levels the program students made significant increases from pre- to post-tests over their corresponding controls.

Table 5 identifies the T tests of significance of gain for each group. Table 6 shows the T tests of significance for the differences of gain between program and control students.

Average percent correct
50
48
46
44
42
40
38
36
34
32
30
Pre
Tes

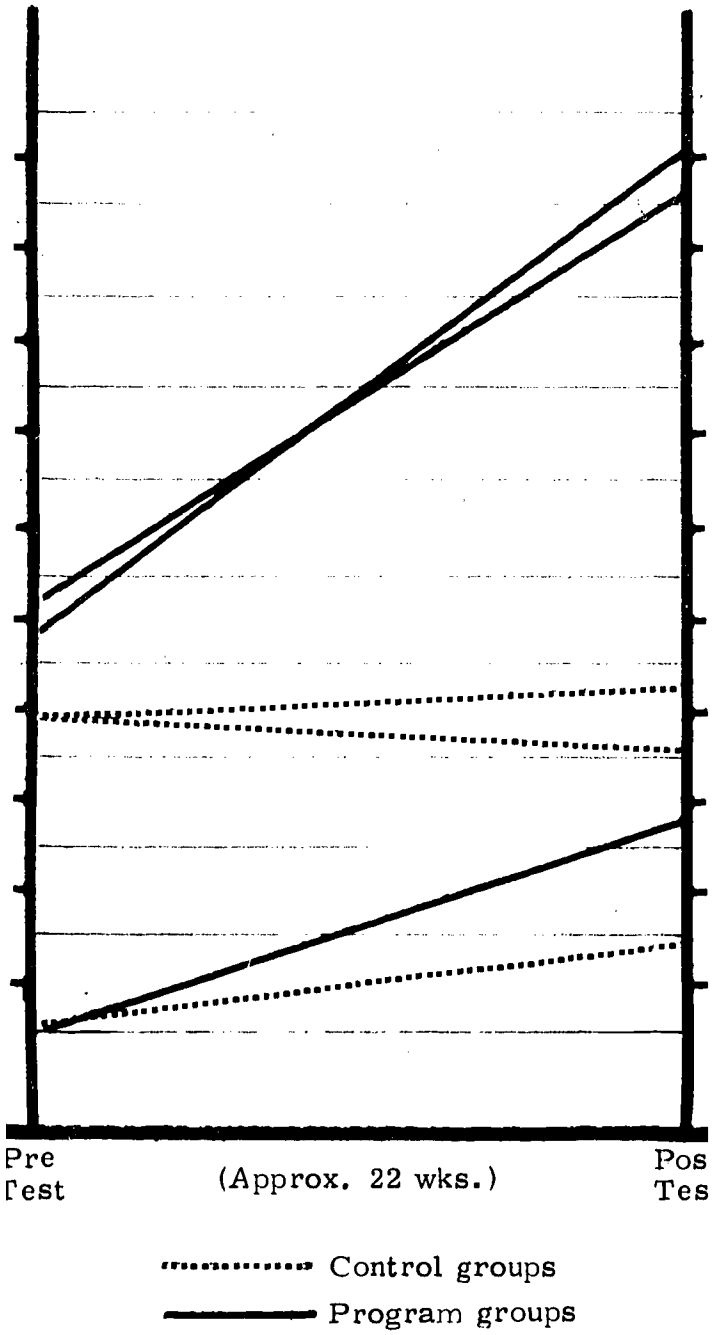

Fig. 1. Pre- and post-test averages program and control groups at differen economic (SES) levels.

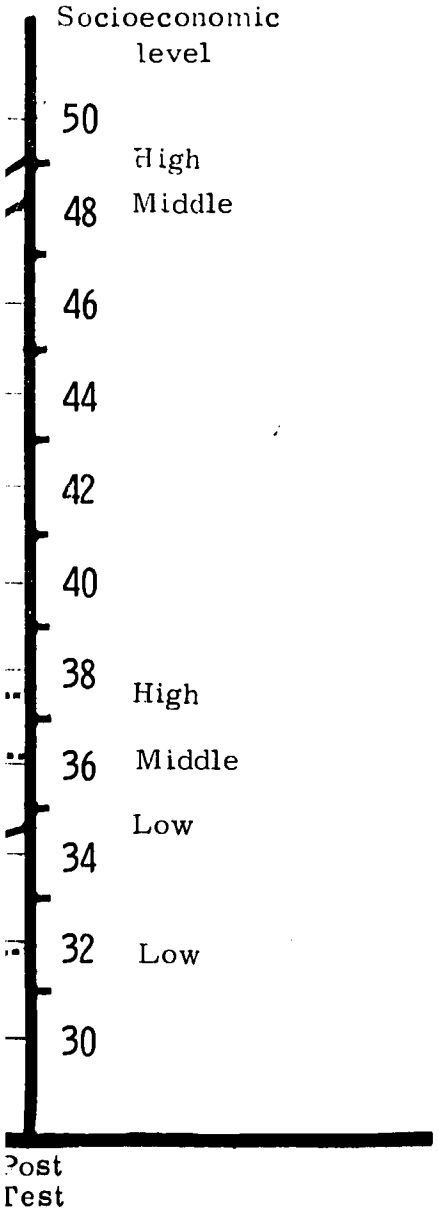

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TABLE 5
T Tests of Gain Scores for Program and Control Students

SES		Program	Control
HIGH		N=164	N=152
	Gain	10.69	.84
	SE of Gain	.74	.86
	T	14.56**	n.s.
MIDDLE		N=159	N=156
	Gain	9.08	-.56
	SE of Gain	.83	.66
	T	10.90**	n.s.
LOW		N=134	N=132
	Gain	4.89	1.71
	SE of Gain	.86	.74
	T	5.90**	2.31*

*p < .05
**p < .001

TABLE 6
T Tests of Differences Between Gains of Program Vs. Control Students

SES	Program Vs. Control	
	Diff. of Gain	T
HIGH	9.86	8.69**
MIDDLE	9.64	9.05**
LOW	3.18	2.86*

*p < .01
**p < .001

All three SES level program groups have gains which are significant beyond the .001 level of confidence. Of the control groups only the low SES students show a gain which is significant beyond the .05 level of confidence. The middle SES control group even shows a slight loss from pre- to post-tests. There is no data which explains why the low SES control group showed a n[illegible]st but significant gain. It may be that there are different rates of change for children who are in the same school grade but who are at differing SES levels.

The similarity of the high and middle SES level students and their dissimilarity with the low SES level students is illustrated in Table 7, which shows a comparison between gains made by SES program and control groups and pre- to post-tests.

TABLE 7
T Tests of Gain Scores Between SES Levels

SES		Program	Control
HIGH-MIDDLE	Difference in Gain	1.61	1.39
	Std. Error of Difference	1.11	1.09
	T	n.s.	n.s.
HIGH-LOW	Difference in Gain	9.52	-8.74
	Std. Error of Difference	1.27	1.14
	T	7.50**	n.s.
MIDDLE-LOW	Difference in Gain	4.19	-2.27
	Std. Error of Difference	1.17	.99
	T	3.57**	2.28*

*p < .05
**p < .001

Teacher Acquaintance with Materials

For purposes of this study, teachers were composed of three types: Teachers who had taught the program the previous year (experienced), teachers who were teaching the program for the first time but who were given one day of in-service training with the materials (trained), and teachers without experience who received no prior training with the materials (non-trained). Table 8 shows the means and standard deviations of the pre- and post-tests scores and the number of students in the groups with the three types of teachers among the three SES levels. The correlations between the pre- and post-tests are also shown.

Table 9 expresses the same data in terms of gain from pre-test to post-test. The average gain for each group and their standard deviations are given.

TABLE 8
Means, Standard Deviations and Correlations Between Pre- and Post-Tests Taken by Program Students of Experienced, Trained, and Non-Trained Teachers for Each of the SES Levels

SES		Experienced		Trained		Non-Trained	
		Pre	Post	Pre	Post	Pre	Post
		N=126		N=172		N=164	
HIGH	Mean	38.43	52.63	35.71	46.23	38.62	49.31
	S.D.	9.08	13.26	9.87	14.13	9.40	12.26
	$r_{(pre-post)}$	.59		.70		.65	
		Pre	Post	Pre	Post	Pre	Post
		N=155		N=131		N=159	
MIDDLE	Mean	38.31	45.33	38.91	46.44	39.15	48.23
	S.D.	11.72	14.76	11.84	13.78	9.83	12.94
	$r_{(pre-post)}$	.75		.74		.61	
		Pre	Post	Pre	Post	Pre	Post
		N=77		N=111		N=134	
LOW	Mean	32.10	41.84	30.37	42.30	29.95	34.83
	S.D.	9.61	11.85	8.98	13.03	8.91	9.87
	$r_{(pre-post)}$	.63		.61		.49	

TABLE 9
Means and Standard Deviations of Gain Scores for the Different Program Students in Each of the SES Levels

		Experienced	Trained	Non-Trained
HIGH	Gain	14.41	10.52	10.69
	S.D.	10.76	10.08	9.41
MIDDLE	Gain	7.02	7.54	9.08
	S.D.	9.72	9.37	10.48
LOW	Gain	9.75	11.93	4.89
	S.D.	8.94	10.39	9.54

All of the groups that took the economics program showed gains which were significant beyond the .001 level of confidence. Our concern here is with the effect of the amount of teacher acquaintance with the program within each SES level and not with the differences between SES levels for a given amount of teacher acquaintance with the program. Table 10 shows T tests of significance between classes within each SES level whose teachers had varying acquaintance with the materials

TABLE 10
T Tests of Significance Between Program Students Whose Teachers had Varying Acquaintance with the Materials

SES		Experienced Vs. Trained	Experienced Vs. Non-Trained	Trained Vs. Non-Trained
HIGH	Difference of Gain	3.89	3.71	(-).17
	Std. Error of Difference	1.23	1.21	1.07
	T	3.15*	3.06*	n.s.
MIDDLE	Difference in Gain	(-).52	(-)2.06	(-)1.54
	Std. Error of Difference	1.14	1.14	1.17
	T	n.s.	n.s.	n.s.
LOW	Difference of Gain	(-)2.19	4.85	7.04
	Std. Error of Difference	1.47	1.37	1.29
	T	n.s.	3.55**	5.45**

*p < .01
**p < .001

Conclusions

Program Compared to Control Groups

Of the program groups whose teachers had no prior acquaintance with the material, the highest gain was made by the high SES group and lowest gain was made by the low SES group. The poorer showing of the low SES program students and the greater showing of the low SES control students is reflected by the smaller difference of gain compared with the high and middle SES groups. The low group had about one-third the difference in gain compared to the other two groups. However, the difference in gain for the low SES students is still significant beyond the .01 level of confidence. There was no significant difference in intelligence scores between these program and control groups at any SES level.

It is beyond the scope of this paper to determine whether the comparatively small difference in gain score between the low SES program students over control students (3.18 percentage points) is large enough to justify using this program instead of a more traditional social studies program. However, the evidence of this research indicates that, in general, a significantly greater amount of economics is

learned by students who are taught the program than by students who are exposed to the regular social studies curricula of their schools. Further, many teachers of the low SES students report a greater amount of interest and "coming alive" in their classes. The amount learned apparently does vary with students of differing socioeconomic levels.

Teacher Acquaintance with Materials

The only groups who are different in gain scores from others on the same SES level are the most predictable ones. High SES students whose teacher had taught the program in the previous year show the highest gains from the program while low SES students whose teacher had never seen the materials have the lowest gain. Of the remaining students there seems to be no evidence that the amount of teacher acquaintance with the materials will make very much difference.

The small but statistically significant differences in intelligence test scores within the middle and low SES levels would not seem to change these conclusions. At the middle SES level the program students with experienced teachers were lower than control students in intelligence test scores but higher in gain scores on the economic tests. At the low SES level, the program students with experienced teachers were higher in intelligence test scores than the other two program groups at the low SES level, but this same group had gain scores which fell only midway between the other two program groups. The pattern of differences in intelligence test scores does not seem to relate to the pattern of differences in gain scores on the economic tests.

While our evidence indicates somewhat greater learning on the part of students whose teachers were experienced or trained in the program, it was found that teachers who have no acquaintance with the program will be able to teach the program effectively. It may be that the structure of the program, along with the detailed teacher's guide and the background essays which are provided with the program, contribute to the teacher's preparation and to the amount of success achieved.