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ABSTRACT

The project was an effort to alleviate a recognized need of educationally disadvantaged students enrolled in vocational agriculture classes in Pennsylvania. This need extended to teacher preparation, instructional materials, and vocational guidance. Instructional materials in ornamental horticulture, agricultural mechanics, and agricultural production were developed and tested. Materials were written at the sixth grade reading level usually in task sheet format. Two teacher institutes were held to improve competency of 25 teachers in the project. Occupational information of entry level type jobs was disseminated to the teachers. In evaluation, it was found that the experimental materials were superior to materials currently in use when criterion measures were achievement and performance tests. Teacher attitude toward disadvantaged students became more positive, with the gains stabilizing during the third project year. Occupational information in the form of a manual was printed and disseminated to guidance counselors and teachers. Appendixes include some of the project developed instructional materials. Also included in the report is a list of theses and publications that resulted from the project. (Author/NJ)

FINAL REPORT

Education in Agriculture for the Educationally Disadvantaged

(School Unit 4-10-14-720-1)

(Project No. 20-3002)

Prepared by

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PREFACE

This project was an effort to alleviate a recognized need of educationally disadvantaged students enrolled in vocational agriculture classes in Pennsylvania. This need extended to teacher preparation, instructional materials, and vocational guidance. The research and development embodied in this project should have impact not only for agricultural education, but for all vocational education. The project was possible because of the financial support of the Research Coordinating Unit of the Pennsylvania Department of Education. Dr. Clarence A. Dittenhafer, RCU staff, also served on the project advisory committee. Other advisory committee members are recognized in the body of the report.

The contributions of the graduate students were a key ingredient toward the successful conclusion of the project. During the three-year span, the following graduate assistants devoted one or more academic terms to project activities. Graduate assistants were: Taylor Byrd, Jr., Susan Meade McFadden, James R. Curtis, Freddie Richards, James Stutzman, Myra Collura, Janis Bartoo, Dennis Milhoan, Robert Phipps, and Prodeep K. Paul. Unique to this project were that three of the graduate assistants were students in special education.

The contributions of Dr. Richard F. Stinson and Dr. William Williams must also be recognized. These men reviewed and revised task sheets to insure their accuracy. Persons in the dairy science and agricultural engineering faculties also gave of their time in critiquing project materials.

CONTENTS

ABSTRACT

Purpose -- The project was to (a) prepare and evaluate instructional materials specially designed for teaching entry level occupational skills in agriculture to disadvantaged youth, (b) to improve teacher proficiency in instructing disadvantaged youth, (c) alert teachers and youth of entry level occupations in agriculture potentially available to the disadvantaged and (d) to identify educationally disadvantaged youth who could benefit from competency in agricultural occupations.

Method -- Instructional materials in ornamental horticulture, agricultural mechanics, and agricultural production were developed and tested. Materials were written at the sixth grade reading level usually in task sheet format. Effectiveness of materials was evaluated for disadvantaged youth and with conventional material. Two teacher institutes were held to improve competency of 25 teachers in the project. Occupational information of entry level type jobs was disseminated to the teachers. Eighth graders in the 19 comprehensive high schools in the project were tested for agricultural interest in each of two years. Interest was analyzed on the basis of demographic factors and disadvantagement.

Results -- It was found that the experimental instructional materials were superior to materials currently in use when the criterion measures were achievement and performance tests. In many of the comparisons the performance of the disadvantaged student was equal to that of students classified as average and above average. Analysis of variance and analysis of covariance were the statistical techniques applied to the data. Teacher attitude toward disadvantaged students became more positive on three of 12 subscales and in

total score from the first to second project year. When tested during the third year, gains previously realized had stabilized.

Occupational information was provided teachers and guidance counselors. A manual, Agricultural Occupations: Entry Level Jobs, was printed and disseminated to project teachers. Agricultural interest of disadvantaged students entering ninth grade agriculture classes was not different from other agriculture students. Interest scores of all students who entered ninth grade agriculture classes was higher than those students who indicated a desire to enroll but who never actually enrolled.

Four doctoral dissertations and three masters papers resulted from the project.

DESIGN AND PROCEDURE

Statement of the Problem

Students with learning difficulties permeate the public school environment. For whatever reason, be it economic, social, cultural, or biological, 12 to 20 percent of the students, depending on whose data are used, can be classified as educationally disadvantaged. That is, these students are two or more years below their grade level in basic skills and unable to succeed in school because of their disadvantagement. Up to this time vocational agriculture teachers have had little or no preparation for teaching slower students. Neither have they had appropriate instructional materials.

To improve the educational environment for slower learners, teachers must be better prepared to deal with many student ability levels in the shops and classrooms. Appropriate curriculum materials must be prepared. Students, including those disadvantaged, need to have realistic occupational goals to mesh with relevant instructional programs.

Given these facts, this project was designed to improve teacher competence, to provide curriculum materials, and to inform teacher and student of occupational opportunities for the educationally disadvantaged.

Objectives

To focus the efforts of the project, four specific objectives and the means for evaluating them were formulated. They were:

1. To prepare and evaluate instructional materials designed to facilitate and improve the instructional program for educationally disadvantaged students, particularly in the subject matter areas of horticulture, animal science, and agricultural mechanics.

Material was evaluated on the basis of student achievement and performance test scores. Also used were Flesch reading level and teacher subjective evaluation.

2. To improve teacher's proficiency for teaching classes that include educationally disadvantaged youth. Two teacher institutes, as well as the instructional material, reference material, and individual conferences, were held to accomplish this goal.

   A teacher attitude inventory was administered three times as a means to assess progress.

3. To assemble and provide teachers with relevant vocational guidance materials so that teachers and students were both aware of occupations potentially available to the educationally disadvantaged student.

   Guidance materials including lists of agricultural job skills were prepared and distributed for teacher and student use in order to fulfill this goal. The School Sentiment Index (1) was used to evaluate student attitudes.

4. To identify educationally disadvantaged students who could benefit from competency in agricultural occupations.

   The Agricultural and Biological Interest Inventory (2) was used to identify eighth grade students with an interest in agriculture.

Procedure

To carry through on the project an advisory committee was formed, personnel were selected, teachers identified, and curriculum materials were developed and evaluated.

Advisory Committee

An advisory committee composed of Dr. Susan Weis, Home Economics Education, Donald Harris, Vocational Industrial Education, Dr. Robert Smith, Special Education, Dr. Samuel Leadley, Rural Sociology, Dr. William Smith, Rural Sociology, all of The Pennsylvania State University, and Dr. Clarence Dittenhafer, Research Coordinating Unit, The Pennsylvania Department of Education, was formed as the first step.

Selection of Cooperating Teachers

Approximately 20 teachers of agriculture were needed in the project to use and evaluate the instructional materials. In addition, it was desirable to have represented in the sample all three instructional areas included in the curriculum development phase. Upon the advice of the advisory committee, all teachers of agriculture in Pennsylvania (294) were surveyed. A two-part instrument was used in the mail survey. Responses were received from 139 teachers - these teachers represented 62 percent of the 221 vo-ag departments in Pennsylvania. From the respondents, 42 teachers were invited to participate in the project. Invitations were issued based on geographic factors, number of disadvantaged students in classes, and subject matter areas being offered. Twenty-five teachers in 24 schools accepted the invitation to participate. Nineteen teachers were in comprehensive high schools. The teachers and schools are listed in Appendix A. Twenty-two teachers stayed with the project until it was completed. Three teachers were added to replace the three teachers who dropped out.

The students affected by the project were those in the schools where a teacher was selected. Students in classes where the instructional materials were taught made up the student population for the study. Eighth grade students in the comprehensive high schools were given the Agricultural and Biological Interest Inventory in 1971-72 and again in 1972-73.

Identification of the Disadvantaged Students

In order to evaluate the effectiveness of the instructional materials for educationally disadvantaged students, it was necessary to identify those students. Several approaches were considered. One of these was IQ score. An immediate difficulty was that in the 24 schools in the project, 14 different

IQ tests had been used. This problem, plus questions concerning the validity of the IQ score for identifying the disadvantaged, dictated other means. Class fifth was another possibility. Indeed, the lower class fifth would show 20 percent disadvantaged -- a figure cited by some to illustrate the disadvantaged population in schools. This, though, assumes an equal number of disadvantaged youth in each school, a gross assumption, indeed. Moreover, the project staff and advisory committee felt it was appropriate to use the State Department of Education definition that students retarded two or more years in academic achievement, and unable to succeed in school because of this deficiency, be considered the educationally disadvantaged population. Reading test scores, in this case Nelson-Denny (3), applied to grade level norms, met the definition criterion -- at least for reading. Upon the advice of the project advisory committee, two additional measures were applied: school grade point average based on a four-point scale and agriculture teacher ranking of student performance. Consequently, three measures were used to differentiate the educationally disadvantaged student. In this manner any bias potentially present in one measure was muted by the application of other criteria. It also precluded arbitrary assignment of an equal number of students from each school to any one category.

These three criteria were applied to each student by means of the ensuing procedure. Each measure was divided into three segments -- educationally disadvantaged, average, and above average. For example, the Nelson-Denny reading test scores were divided (1) two or more grades below grade level norm, (2) less than two grades below up to grade level norm, and (3) above grade level norm. The school grade point average was segmented

as follows: above 2.66, 1.33 to 2.66, and below 1.33. The teacher ranking of students was divided according to lower, middle, and upper thirds. For each of the three measures, one point was assigned to the lower division, two points to the central area, and three points to the upper performance category. Thus, a total number of points was obtained for each student. Lowest possible number of points was three, while the maximum number was nine. Students with point totals of 3 to 4 were classified disadvantaged; 5 to 7 points, average; and 8 to 9 points, above average. The illustration below shows how the classification procedure was applied to specific student data.

Student No.	Nelson-Denny Reading Test	School G.P.A.	Teacher Ranking	Total Points*
1	1	2	1	4
2	1	2	2	5
3	1	1	1	3
4	3	2	3	8
5	3	2	2	7
6	2	2	1	5
7	1	2	2	5
8	3	3	3	9
9	3	2	3	8
10	2	3	2	7

*Disadvantaged (3-4 points).	Students No. 1, 3
Average (5-7 points)	Students No. 2, 4, 6, 7, 10
Above average (8-9 points)	Students No. 4, 8, 9

Where measures of educationally disadvantaged student performance were analyzed, the above classification procedure was used to identify such students.

Experimental Design

To evaluate the instructional material developed in this project, disadvantaged student performance was compared to performance of more advantaged youth (Figure 1). In some instances this evaluation was replicated three times. With instructional material produced later in the project, replication was not possible. Here teacher analysis and student evaluation were included. Early in the project the task analysis system was compared to other methods of teaching subject matter (Figure 2). Figures 1 and 2 below illustrate the experimental design for testing the instructional materials. Analysis of covariance and analysis of variance were used to test for differences. A significance level of .05 was required.

Disadvantaged			Performance and/or Achievement Tests
Average	Pretest	Treatment	Teacher evaluation
Above average			Student evaluation

Figure 1. Experimental design for comparing educationally disadvantaged students with more advantaged youth.

Task Analysis System with visual aids, performance objectives	Pretest - all students	Performance and/or achievement test scores of students used for evaluation
Traditional System varied with specific unit but included theory, workbooks		

Figure 2. Experimental design for comparing task analysis with theory oriented instructional materials.

To inventory teacher attitude toward disadvantaged students, a 12-concept semantic differential attitude scale was given three times during the course

of the project. This scale measured whether teacher attitudes changed as a result of the two teacher institutes held in the summers and the intensive individual work done with the teachers during the school year. Figure 3 shows the attitude evaluation design.

	Feb. 1972	Spring	Summer	1972-73 school year	Summer 1973	1973-74 school year
Treatments	None	Used Project Material	Teacher Institute	Used Project Material	Teacher Institute	Used Project Material
Evaluation	Attitude Scale			Attitude Scale (December)		Attitude Scale (December)

Figure 3. Evaluation of teacher attitude toward educationally disadvantaged youth.

Student interest in agricultural occupations was determined by the Agricultural and Biological Interest Inventory (2). This was administered to eighth grade students in the comprehensive high schools in the project in 1971-72 and 1972-73. Enrollment of students in 9th grade agriculture classes was subsequently observed. Once enrolled in 9th grade, these students' scores were analyzed by student classification.

In addition, students using the project materials were given the School Sentiment Index (1). Two applications were made of this data: (1) relationship of student attitude to student performance was observed, and (2) differences in attitudes among student classifications were analyzed.

Graduate students working with the project were encouraged to develop their theses proposals around project objectives. In total, four doctoral dissertations and three masters theses were completed within the scope of this project.

Curriculum Development

Early in the project several staff and advisory committee decisions were made that determined the nature of the curriculum materials. These were:

1. Instructional materials would be based on skills and knowledges needed in entry level occupations.
2. Material would be presented in the form of task sheets based on occupational analysis.
3. Behavioral objectives would be formulated for each task.
4. Instructional aids would be developed or identified to supplement the task sheets.

All of the instructional materials for the project were written around this general format.

SUMMARY OF RELATED LITERATURE

Since the initiation of this project in the summer of 1971, vocational education can report significant progress in serving the occupational aspirations of educationally disadvantaged students. In terms of enrollment data alone, progress has been substantial. By 1972, 1,838,000 special needs students were enrolled in vocational programs, an increase of 25,000 since 1965 (4). In 1973, 13.3 percent of all vocational enrollment in the United States were counted as persons with special needs (5). This data indicates that although progress has been made, all students with special needs are still not being served. Earlier studies show that as many as 20 percent of high school aged youth may be disadvantaged (6) (7).

Perhaps the most progress has been made in the areas of research on family factors, student motivation, and associated program development. Project REDY (8) and Project WARSAW (9), are key illustrations. The positive role of cooperative education is aptly illustrated by Operation Salvage (10). This program is one of many that demonstrates that disadvantaged students do learn and are acceptable employees in real job situations. The weight of the research evidence is that disadvantaged students do succeed in school and on-the-job when they are challenged by realistic occupational opportunities.

Teacher preparation has received some attention. The work of Dawson (11), Bell (12), and Bobbitt (13), are good illustrations of these attempts to promote teacher empathy with disadvantaged students and to improve teacher competence in educating disadvantaged youth. All three focus on student needs as a basis for instructional program development. Three publications,

What Vocational Education Teachers Should Know About Disadvantaged Youth In Rural Areas (14), Teaching the Disadvantaged, a curriculum guide for classes of disadvantaged students in agricultural education programs (15), and Techniques for Teaching Disadvantaged Youth in Vocational Education (16), have potential for teacher preparation. To date, preparation of vocational teachers to work with disadvantaged students at the pre-service level has not developed rapidly.

The contribution of this project is that it provides research data that supports guidance, curriculum development, and teacher preparation efforts as productive uses of resources for improving the instruction of disadvantaged students.

FINDINGS AND ANALYSIS

Curriculum Materials Development and Related Research

Curriculum development for the project concentrated in three areas: agricultural production, agricultural mechanics, and ornamental horticulture. The framework within which project materials were written consisted of:

1. Entry level occupations - the materials written would deal with tasks common to entry level occupations. Elements within the tasks should be sequential.
2. Emphasis should be on manipulative type skills commonly performed by workers in that occupation.
3. Insofar as feasible, the format would be task oriented with behavioral objectives and a step by step procedure for accomplishing the task.
4. Instructional aids would be developed/identified to assist in the implementation of the tasks.
5. Reading level would be at the sixth grade norm.

To ascertain the effectiveness of the prepared instructional materials, they were field tested during the course of the project. This section discusses the materials produced and presents the analyses of the results of field testing.

Ornamental Horticulture

Task sheets developed in ornamental horticulture are listed in Appendix B. Additional task sheets are still being developed to fill in existing gaps.

Initially this experimental instructional material was compared to other methods already in use. The results are reported in terms of achievement and performance test scores in Table I.

Table 1. Student mean achievement and performance test scores in nursery production by instructional treatment.

Instructional treatment	N	Mean score (achievement)	Mean score (performance)
Task analysis (experimental)	88	15.3[a]	8.1
Manual	108	14.8[a]	5.6[a]
Outline	80	11.4	6.1[a]

[a]Means followed by same letter are not significantly different by Analysis of variance and Duncan's Modified (Bayesian) Least Significant Test. P = .001.

It is evident that the experimental instructional materials were effective in teaching both knowledge and performance skills. The crucial test, though, depended upon their usability with disadvantaged students. This evaluation was made using an achievement test and a performance test. The results are printed in Tables 2 and 3. Analysis of covariance was applied to test for differences.

Table 2. Nursery production achievement test scores by student classification groups.

Student Classification	N	Mean Pretest	Mean G.P.A.	Mean Test	Adjusted Mean Score
Disadvantaged	60	10.0	1.8	15.6	16.2[a]
Average	60	11.4	2.2	15.4	15.5
Above Average	60	13.0	2.9	16.8	16.1

[a]No significant difference at the .05 level by multiple classification analysis of covariance.

Table 3. Nursery production performance test scores by student classification groups.

Student Classification	N	Mean G.P.A.	Mean Teacher Rank	Skill Score	Adjusted Score
Disadvantaged	60	1.8	4.9	7.3	6.9[a]
Average	60	2.2	9.5	6.9	6.9
Above Average	60	2.9	13.3	7.0	7.1

[a]No significant differences at the .05 level by multiple classification analysis of variance.

The performance of the disadvantaged student on both the achievement and the performance test were encouraging. In the analysis a subsample of 60 students in each classification group was drawn in order to use a computer analysis of covariance programs that required equal sub groups. On the performance test (Table 3) grade point average and teacher rank of student in agriculture class were used as covariates. In the achievement test (Table 2) pretest score and grade point average were covariates. A significant correlation existed between School Sentiment Index Scores and student performance.

In the second year of the project, a series of slides and film loops were developed to complement the task sheets. The six colored slide series were:

	Task Sheet
1. Mixing Soil on Table (Potting Bench), 21 slides, script	NP-6
2. Mixing Soil with a Concrete Mixer, 15 slides, script	NP-7
3. Mixing Soil on Floor, 13 slides, script	NP-8
4. Mixing Fertilizer with Soil, 21 slides, script	NP-10
5. Removing Rooted Cuttings, 13 slides, script	NP-11
6. Transplanting Rooted Cuttings, 13 slides, script	NP-12

Eleven film loops were made to illustrate the task sheets. They are:

		Task Sheet
1.	Planting a Balled and Burlapped Shrub	LC-2
2.	Mixing Soil on a Potting Bench	NP-6
3.	Steaming Soil	NP-9
4.	Mixing Soil on the Floor	NP-7
5.	Mixing Soil with a Concrete Mixer	NP-8
6.	Mixing Fertilizer with Soil	NP-10
7.	Removing Rooted Cuttings	NP-11
8.	Transplanting Rooted Cuttings into Pots	NP-12
9.	Putting Pots into Place after Planting	NP-13
10.	Transplanting From Pots to Containers	NP-14
11.	Digging a Balled and Burlapped Shrub	NP-2

The effectiveness of the film loops and slides as supplementary aids was examined during the final year of the project and is reported in the Milhoan thesis.

Quality Milk Production

For the occupational title, dairy farm worker, the tasks involved in milking cows were coordinated into a previously existing unit titled, Quality Milk Production (17). The unit was revised to the sixth grade reading level and task sheets added for the required manipulative skills. It was published in preliminary form and field tested during the first project year. After revision, the field testing was replicated in each of the two succeeding years. These results are shown in Table 5.

Table 5. Student scores by ability level of students on quality milk achievement test in project all years.

Year	Classification	N	Pretest	Test	Adjusted Test
1971-72	Educationally Disadvantaged	29	17.3	27.1	28.9[a]
	Average	28	20.8	31.1	31.1
	Above Average	24	22.9	34.5	32.3
Replication 1					
1972-73	Educationally Disadvantaged	19	17.0	24.3	27.2[b]
	Average	41	17.5	27.4	27.7
	Above Average	23	21.8	30.4	26.4
Replication 2					
1973-74	Educationally Disadvantaged	48	18.0	24.3[c]	
	Average	49	19.0	26.6	
	Above Average	17	19.8	32.3	

[a] Disadvantaged significantly lower than the above student at the .05 level. Tested by covariance and Duncan's Modified (Bayesian) Least Significant Differences.

[b] No significant difference.

[c] Disadvantaged student lower than above average student at the .05 level. Tested by analysis of variance and Duncan's Modified (Bayesian) Least Significant Differences.

For the quality milk unit the results of the field testing for all years were very much alike. The only differences being that in the first and third years the educationally disadvantaged students mean score was significantly lower than the above average student. In the second year there were no significant differences in student scores. The materials had been revised and printed in manual form between the first and the second year.

Since the results for the quality milk unit were somewhat different than for the task sheets in horticulture, it is appropriate to examine the differences between the two sets of materials. The quality milk unit had fewer manipulative type skills in proportion to the total package than did the task sheets in horticulture. Students were required to read more. It is important to note the gain of the disadvantaged students over pretest.

The effect of slides and behavioral objectives on disadvantaged student learning were also examined in relation to the quality milk unit. Forty-nine disadvantaged students were included in this phase of the experiment. The results are shown in Table 6.

Table 6. Disadvantaged student achievement test scores by type of instructional material.

Description of Material	N	Pretest	Grade Point Average	Adjusted Test
1. Experimental unit including behavioral objectives and slides	29	17.3	1.7	27.0[a]
2. Manual and behavioral objectives	4	18.0	2.1	24.0
3. Experimental unit with slides minus behavioral objectives	16	16.9	1.6	22.1

[a]Significantly higher than group 3 at the .01 level. Tested by covariance and Duncan's Multiple Range Test.

Those students taught with the experimental unit including behavioral objectives and slides scored significantly higher on the achievement test than those students taught with the same materials minus the behavioral objectives.

Basic Electricity

Farm and residential wiring skills are essential knowledge for farm workers and electrician's helper occupations. In this project, the focus was on those elementary wiring skills that a farm worker could perform while working with a skilled electrician. Such skills are also essential as a starting place for those students capable of more skilled occupations. Initially, 27 task sheets were developed. (Listed in Appendix C)

These task sheets were revised during the third year of the project. Also, during the third year an electrical wiring simulation panel was developed. Plans for this are available to teachers. The simulation panel is scheduled for pre-service and in-service instruction of teachers of agriculture. This should provide teachers realistic experience with the task analysis system.

The electric wiring task sheets were field tested in each of the three project years. During the first year, the experimental materials were compared to a theory oriented basic electricity unit. This comparison is shown below for both achievement and performance scores.

Table 8. Mean performance and achievement test scores of students taught by theory or task unit.

Units	N	Performance Test	Achievement Test
Experimental (Skill)	144	2.26[a,b]	19.32[a]
Theory	120	3.05	15.85

[a]Experimental unit scores significantly higher at .001 level by analysis of variance.

[b]Scoring 1 = A, 2 = B, 3 = C, 4 = D.

Students taught by the experimental unit clearly performed at a higher level whether measurement was made by means of an achievement or a performance test. Performance of disadvantaged students was observed in each of the project years. Achievement test scores are shown in Table 9.

Table 9. Student scores by ability level of students on basic electricity achievement test in all project years.

Year	Classification	N	Pretest	Test	Adjusted Test
1971-72	Educationally Disadvantaged	60	11.8	16.9	17.9[a]
	Average	60	12.1	17.5	17.8
	Above Average	60	13.9	18.5	17.3
Replication 1					
1972-73	Educationally Disadvantaged	15	10.6	13.7[b]	17.8[a]
	Average	34	12.9	17.6	17.1
	Above Average	24	14.5	19.5	17.6
Replication 2					
1973-74	Educationally Disadvantaged	14	7.9	11.7[a]	
	Average	19	6.9	10.2	
	Above Average	4	8.0	8.3	

[a]No significant difference at .01 level by analysis of covariance or analysis of variance.

[b]Significantly lower than above average group by analysis of variance and Duncan's Modified (Bayesian) Least Significant Difference Test.

Table 10. Achievement test scores of students according to classification of institutional material and student performance grouping first project year.

Material	Student	N	Pretest	Ag: Class fifth	Posttest	Adjusted posttest
Theory unit						
	Disadvantaged	30	10.5	4.4	13.8	15.5
	Average	30	12.9	3.0	16.1	15.9
	Above Average	30	15.8	1.5	18.3	16.4
Skill unit						
	Disadvantaged	30	13.1	4.5	20.0	20.2[a,b]
	Average	30	11.4	3.0	18.9	19.7
	Above Average	30	12.0	1.6	18.3	18.2

[a]Significantly higher than disadvantaged students taught by theory unit.
[b]No significant difference among students taught by skill unit.

The data in Tables 8, 9, and 10 clearly illustrate the results of the experiment in terms of achievement test scores. The "Skill" unit was significantly superior to the "Theory" unit according to the achievement test results. No differences among student categories were present within either unit, except for the unadjusted test scores of disadvantaged students for Replication I, which were lower. However, the disadvantaged student taught by the skill unit scored significantly higher on the achievement test than the disadvantaged student taught by the theory unit.

From these results it is evident that the skill oriented (task sheet) unit was superior to the theory oriented units in both performance and achievement test scores. Disadvantaged youth taught by the skill unit scored significantly higher than those taught by the theory unit.

Electric Motors

A series of lesson plans, task sheets, and resource materials were assembled for teaching electric motors. This unit was subjected to teacher evaluation. Fifteen project teachers returned evaluations. All agreed that although it was a step in the right direction, it contained too much in the way of operating theory to be appropriate for disadvantaged students. This manual is under revision with greater emphasis being placed on the task sheets necessary to perform the operation and maintenance function required of a farm worker. Preliminary task sheets developed are listed in Appendix D.

Safe Power Shop Equipment Operation

Early in the project, teachers informed the project staff that a systematic method needed to be devised for teaching disadvantaged students the safe use of power shop equipment. Such material was developed and field tested during the final year of the project. Evaluation was based on teacher and student reactions. Twelve teachers rated the unit on a six-point scale ranging from very high to very low. Three rated it very high; six, high; and three, medium value. Responses of nine teachers on the appropriateness of the material for each student is shown in Figure 4. The title of the published manual is Safe Power Shop Equipment Operation (18).

	Teacher Rating				
Student Classification	Excellent	Good	Medium	Fair	Poor
Disadvantaged		2	2	4	
1 year under grade level	1	2	4	1	
On grade level	1	6	1		
1 year above grade level	2	5	2		
2 years above grade level	2	5			

Figure 4. Rating of unit by nine teachers for each student in their classes based on reading level.

Of the nine teachers who made this rating, the feeling seemed to be that the unit was better adapted for the average and above average student than for the disadvantaged student. These ratings were taken into account when the material was revised and published for statewide use.

Evaluation was based on the ninth grade student's confidence in their ability to operate the 15 pieces of shop equipment safely after instruction. These results are shown in Table II.

Table II. Student self-evaluation of ability to operate power shop equipment safely after instruction.

Equipment	N	Student Ability to Operate				
		Excellent	Good	Medium	Fair	Poor
Portable circular saw	131	23	52	30	24	2
Sabre saw	130	30	49	42	7	2
Radial arm saw	146	24	62	40	19	1
Table saw	152	32	62	40	16	2
Jointer	134	34	55	35	10	0
Portable drill	144	59	65	14	6	0
Band hacksaw	65	22	21	15	5	2
Reciprocating hacksaw	64	[illegible]	25	13	6	2
Grinder	139	33	55	36	13	2
Arc welder	106	18	37	30	18	3
Drill press	146	33	64	34	15	0
Oxyacetylene welder	103	11	33	19	27	13
Belt sander	127	42	57	22	4	2
Finishing sander	124	51	53	18	2	0

Not all students had the opportunity to learn to use all tools taught in the manual for several reasons. Not all shops had all of the tools and not all students had completed the unit by the end of the school year. From the responses, it is evident that most students felt that they had learned how to use the shop equipment safely.

Guidance

The guidance objectives of the project included both the teacher and the student. To aid the teacher in his counseling of students, a manual, Agricultural Occupations: Entry Level Jobs (19), was prepared and distributed to teachers and guidance counselors in the project schools. After field testing and revision, it was mailed to all agriculture teachers in Pennsylvania. This manual consisted of a listing of occupational titles in agriculture from the Dictionary of Occupational Titles categorized by the seven instructional areas in agriculture. Only those occupational titles important in Pennsylvania were included. A worksheet was devised to aid teachers and students in matching student capabilities with job requirements. In addition, teachers were notified of the availability of the Pennscript "special education deck" which includes some agricultural occupations.

Interest Inventory

In each of the first two project years, the Agricultural and Biological Interest Inventory (2), was administered to eighth graders in the comprehensive high schools in the project. Of those who entered ninth grade agriculture classes a year later, scores were compared on the basis of agricultural interest and educational disadvantagement. A summary of the interest scores for each of the years is presented in Table 12.

Table 12. Summary of interest inventory scores of eighth grade students responding "yes" and "no" to possible enrollment in agriculture classes as compared to actual enrollment.

Interest area	"Yes"	"No"	"Enrolled"	Disadvantaged 9th grade
1971-72				
N	1497	834	221	153
Total score	107.9[a]	82.1	127.8	131.6
Animals	26.3	20.4	30.5	32.4
Plants	28.2	23.0	30.5	31.1
Mechanics	26.6	18.9	35.6	36.6
Business	26.8	19.9	31.1	31.7
1972-73				
N	1391	410	277	137
Total score	97.6[a]	88.5	118.9	117.4[b]
Animals	23.8	21.4	28.4	28.2
Plants	25.4	23.2	27.2	26.9
Mechanics	25.6	22.6	34.1	35.2
Business	22.8	21.5	29.2	27.1

[a]Students responding "yes" had significantly higher total and part scores than those responding "no" by analysis of variance.

[b]Disadvantaged students enrolled not significantly different from all students enrolled. t-test.

In both years, as might be expected, those eighth graders who indicated an interest in taking an agriculture course(s) in high school scored significantly higher in all phases of the inventory than those youth who did not hold this expectation. Scores of disadvantaged students who enrolled in agriculture in ninth grade were not different from their more advantaged counterparts.

The effect of father's occupation on student preference and choice was also observed. Results are tabulated in Tables 13 and 14. Three categories of father's occupation were used: farming, agricultural non-farm, and non-agricultural. Information on father's occupation was available for 1202 of the 1497 "yes" respondents in 1971-72 and for 1269 in 1972-73.

Table 13. Mean interest scores of students responding "yes" to agricultural courses stratified by father's occupation.

Father's occupation	N	Interest scores				
		Total	Animal	Plants	Mechanics	Business
1971-72						
Farming	100	127.8[a]	31.5[a]	31.9[a]	34.3[a]	30.1[a]
Ag. non-farm	87	105.2	24.3	25.6	29.7	25.5
Non agricultural	1015	108.8	24.8	27.2	27.2	26.3
1972-73						
Farming	89	113.3[a]	29.5[a]	28.9[a]	28.2[a]	26.9[a]
Ag. non-farm	60	100.0	24.5	26.4	25.4	24.3
Non agricultural	1120	95.8	23.4	25.1	24.2	23.2

[a]Significantly different at .01 level from each of other categories. Analysis of variance and Duncan's Modified (Bayesian) Least Significant Difference Test.

Table 14. Mean interest scores of students enrolled in ninth grade stratified by father's occupation.

Father's occupation	N	Interest scores[a]				
		Total	Animal	Plants	Mechanics	Business
1971-72						
Farming	55	126.5	30.7	30.3	34.9	30.7
Ag. non-farm	10	131.3	31.5	28.2	38.5	33.1
Non agricultural	156	128.0	30.4	30.8	35.7	31.1
1972-73						
Farming	63	120.3	28.1	27.9	35.1	29.2
Ag. non-farm	23	120.0	29.0	27.1	33.8	30.1
Non agricultural	191	117.2	27.6	26.8	34.1	28.7

[a]No significant differences by analysis of variance.

For 1972-73 scores were categorized by sex of students. These results are in Table 15. Male students scored significantly higher in total, business, and mechanics interest. No differences were observed for animals and plant interest.

Table 15. Summary of agricultural and biological interest inventory scores in 1972-73 by sex of students.

Sex	N	Total Score	Animals	Plants	Mechanics	Business
Male	1030	101.5[a]	24.2	25.2	27.9[a]	24.2[a]
Female	720	92.1	23.5	25.3	20.9	22.4

[a]Significant at the .01 level by analysis of variance.

In 1972-73, in 12 schools not previously involved in the project, four measures of vocational maturity were administered to a random sample of 490 junior high school students. Measures used were the JIM scale (20), Career Maturity Inventory (21), vocational aspiration scale, and a vocational expectation scale developed for the project. Students were classified by the guidance counselors in the school as educationally disadvantaged or advantaged and by male or female. Information concerning the education and income levels for parents of both groups of students revealed that the combined years of schooling for the parents of the disadvantaged group was 19.2. For the parents of the advantaged group, it was 22.2. The mean family yearly income was $5,968 for the less advantaged group and $7,232 for the advantaged students. Student scores are presented in Table 16.

The educationally disadvantaged scored lower on all four measures of vocational maturity than did the more advantaged student. This pattern was also true for the three categories separated by sex, except for the aspiration score for the educationally disadvantaged female.

Table 16. Four measures of vocational maturity classified by advantaged and disadvantaged students and by sex.

	Student Classification	N	JIM Scale	CMI	Aspiration	Expectation
All	disadvantaged	154	95.5[a]	26.5[a]	4.6[a]	3.7[a]
	advantaged	336	110.7	30.7	5.0	3.9
Male	disadvantaged	96	92.6[a]	25.8[a]	4.6[a]	
	advantaged	189	107.2	29.8	5.0	
Female	disadvantaged	58	101.2[a]	27.6[a]	4.8	
	advantaged	147	115.2	32.2	5.0	

[a]Significant at .01 level by analysis of variance.

Teacher Institutes

In the summer of 1971 and again in 1972, teacher institutes were held for the project teachers. The first was for one week while the latter was for three days. Programs for each are in Appendix E. In addition, teachers all received a copy of Techniques for Teaching Disadvantaged Youth in Vocational Education (16). Project teachers also worked closely with project staff in implementing the experimental instructional material. To measure the total impact of project activities on teacher attitude toward disadvantaged students, a 12-concept semantic differential attitude scale was administered three times during the course of the project. Scales were given to the teachers by members of the project staff. Results are printed in Table 17.

Responses scoring above 48 indicate a positive response, while scores of less than 48 are negative. Possible range in scores was from 12 to 84.

Table 17. Teacher attitude scores on 12 concepts measured by semantic differential scale.

Concepts	Winter 1972 N = 25	December 1972 N = 25	December 1973 N = 23
Teaching the disadvantaged	61.1	65.0	64.0[d]
Counseling the disadvantaged	61.2	67.6[b]	66.5[b]
Hostile students	32.3	42.2[a]	39.8[a]
Visiting homes of disadvantaged	63.5	66.6	65.2
Verbal ability of disadvantaged	56.9	61.2	57.7
Motivating the disadvantaged	63.6	68.8	68.5
Educationally deprived	39.6	44.0	44.5
Communicating with the disadvantaged	63.0	67.9[c]	65.4
Individualized instruction	70.7	73.0	73.4
New program development	67.9	70.5	69.1
Evaluating the disadvantaged	62.3	63.3	63.4
Understanding the disadvantaged	66.4	69.4	68.0
Total	708.9	759.5[b]	745.4[b]

[a]Significant from first scores at .01 level by analysis of variance.
[b]Significant from first scores at .05 level by analysis of variance.
[c]Significant from first scores at .10 level by analysis of variance.
[d]Third test scores not significantly different from second test scores.

Teacher attitude was more positive on all 12 of the concepts at the time of the second test. In three, counseling the disadvantaged, hostile students, and communicating with the disadvantaged, the change was significant. "Hostile students" and "educationally deprived" were the only concepts that were negative on the first assessment. Although both were still negative on the retest, both had moved in a positive direction; "hostile student," a rather dramatic ten points. Data from the third test administered in December 1973 showed no change in attitude from the previous year's scores.

This data seem to indicate that participation in the project improved teacher attitude toward working with educationally disadvantaged students.

List of Theses and Publications Resulting from the Project

Theses

1. Adams, Willie G., "Influence of Career Education on Motivation and Aspiration of Middle School Age Educationally Disadvantaged Youth." D.Ed., The Pennsylvania State University, University Park, 1974.

2. Byrd, Taylor, Jr., "Effects of a Task Analysis Model with Behavioral Objectives on Cognitive and Psychomotor Learning of Educationally Disadvantaged Students," Ph.D., The Pennsylvania State University University Park, 1972.

3. Curtis, James R., "Evaluating Behavioral Objectives, Task Analysis, and Visual Materials for Teaching Quality Milk Production to Three Academic Achievement Levels of High School Students," M.S., The Pennsylvania State University, University Park, 1973.

4. Milhoan, Dennis, "The Effectiveness of Visual Media in Teaching Psychomotor Concepts Involving the Performance of Ornamental Horticulture Tasks," M.Ed. (Thesis in process), The Pennsylvania State University, University Park.

5. Mincemoyer, Donald L., "Evaluation of Student Workbook to Teach Safe Power Shop Equipment Operation," M.Ed., (Thesis in process), The Pennsylvania State University, University Park.

6. Paul, Prodeep K., "Attitudes and Performance of Students with Varying Academic Abilities in High School Agriculture Curricula In Pennsylvania," Ph.D., The Pennsylvania State University, University Park, 1974.

7. Richards, Freddie L., "Effects of Performance Objectives on Electrical Skill Learning of Educationally Disadvantaged Students," Ph.D., The Pennsylvania State University, University Park, 1972.

Publications

1. Byrd, T. Jr., R. F. Stinson, S. M. Curtis, Nursery Production -- A Task Analysis Instructional System, Teacher Education Series, Volume 14 Number 2t, 1973, Department of Agricultural Education, The Pennsylvania State University.

2. Curtis, J. R., and S. M. Curtis, Quality Milk Pro uction (High School Edition), Teacher Education Series, Volume 14, Number 1s, 1973.

3. Curtis, S. M., T. Byrd, Jr., and S. M. McFadden, "Teachers Respond to the Educationally Disadvantaged," Agricultural Education Magazine, May 1973.

4. Curtis, S. M., "Does Ag Interest Mean Ag Enrollment?" Agricultural Education Magazine, July 1974.

5. Curtis, S. M., "Successful Teaching Among Slow Learners Changes Teachers' Views," Science in Agriculture, Winter 1974.

6. Mincemoyer, Donald L., W. Williams, S. M. Curtis, Safe Power Shop Equipment Operation, Teacher Education Series, Volume 15, Number 3s, 1974.

7. Paul, Prodeep K., Agricultural Occupations: Entry Level Jobs, Teacher Education Series, Volume 15, Number 2t, 1974.

Summary and Conclusions

The research cited in this report, as well as that reported in the theses stemming from the project, strongly suggests strategy to be followed in the preparation of instructional materials for educationally disadvantaged youth.

1. Task sheets, based on job analysis of an occupation, e.g. nursery worker, dairy farm worker, and electrician's helper, are effective for teaching educationally disadvantaged youth.
2. Performance objectives improve student performance.
3. Reading level must not be higher than sixth grade. With the reading barrier removed, much of the disadvantagement disappears.
4. Audio-visual aids such as slides, cassette tapes, and film loops improve performance.

Students not disadvantaged also benefited from the experimental instructional materials when comparisons were made to conventional instructional units. Performance was measured by achievement tests and performance tests. A limitation of this work is that all of it has been done with entry level type jobs.

The attitude of teachers toward educationally disadvantaged youth becomes more positive as teachers experience success in teaching them. The combination of well-adapted educational materials, guidance information, and the summer institutes changed teacher attitudes in a positive direction. The more positive attitude developed early in the project stabilized as the project continued.

Declared interest of students in agricultural courses on an agricultural and biological interest inventory do not necessarily result in enrollment

in these courses. Students with farm backgrounds have higher interest scores than those who do not. Among students who actually enrolled, there was no difference in student interest scores among three backgrounds described by father's occupation. Educationally disadvantaged students enrolling in ninth grade agriculture classes have as high an interest in agricultural subjects as do not disadvantaged ninth graders.

End Notes

1. School Sentiment Index, Instructional Objectives Exchange, Los Angeles 1965.

2. R. W. Walker and Glenn Z. Stevens, Agricultural and Biological Interest Inventory, Interstate, Danville, Illinois, (Penn State Scoring Key).

3. M. J. Nelson and E. C. Denny, The Nelson-Denny Reading Test, Form A, Houghton Mifflin Company, Boston, 1960.

4. Don Gentry, "A Commitment That Won't Go Away," AVA Journal, September 1974, p. 32.

5. Lowell Burkett, "Latest Word From Washington," AVA Journal, September 1974, p. 9.

6. Charles Oaklieb, Review and Synthesis of Research on Vocational and Technical Education for the Rural Disadvantaged, The Center for Vocational and Technical Education, The Ohio State University, Columbus, 1971.

7. S. M. Curtis, et. al., "Teachers Respond to the Educationally Disadvantaged," Agricultural Education Magazine, Vol. 45, No. 11 (May 1973).

8. L. J. Phipps, et. al., Development of Human Resources through a Vocational Oriented Educational Program for Disadvantaged Families in Depressed Rural Areas, College of Education, University of Illinois, Urbana, IL, 1970.

9. Robert W. Walker, A Prevocational Laboratory Curriculum for Rural Disadvantaged Youth, College of Education, University of Illinois, Urbana, IL, 1970.

10. James H. Smith, Operation Salvage, York County Vocational-Technical School, York, PA.

11. James I. Dawson, Inservice Retraining of Vocational Education Personnel to Amplify and Enhance Their Role in Working with Disadvantaged and Handicapped Learners, Alabama A & M University, Huntsville, AL, 1971.

12. Arthur P. Bell, Motivation and Education of Disadvantaged Pupils, Report of the Institute for teachers of students with special needs, North Carolina A & T University, Greensboro, NC, 1970.

13. Frank Bobbitt, Rural Education in Michigan Especially for Disadvantaged Youth, Report No. 26, Rural Manpower Center, Michigan State University, East Lansing, MI, December 1971.

14. Robert W. Walker, What Vocational Education Teachers Should Know About Disadvantaged Youth in Rural Areas, Information Series No. 47 (VT 013 637), ERIC Clearinghouse on Vocational and Technical Education, The Center for Vocational and Technical Education, The Ohio State University, Columbus.

15. John R. Crunkilton, Teaching the Disadvantaged, College of Education, Virginia Polytechnic Institute and State University, Blacksburg, VA, September 1972.

16. Frank Bobbitt and Linda Letwin, Techniques for Teaching Disadvantaged Youth in Vocational Education, Special Paper No. 14, Rural Manpower Center, Michigan State University, East Lansing, MI, December 1971.

17. R. W. Weller, G. Z. Stevens, and G. M. Love, Quality Milk Production, Teacher Education Series, Volume 5, No. 2, The Department of Agricultural Education, The Pennsylvania State University, 1964.

18. Donald L. Mincemoyer, Safe Power Shop Equipment Operation, Teacher Education Series, Volume 15, No. 3s, The Department of Agricultural Education, The Pennsylvania State University.

19. Prodeep K. Paul, Agricultural Occupations - Entry Level Jobs, Teacher Education Series, Volume 15, No. 2t, The Department of Agricultural Education, The Pennsylvania State University, 1974.

20. Jack R. Frymier, JIM Scale Student Questionnaire (Form F), College of Education, The Ohio State University, Columbus, 1965.

21. John O. Crites, Career Maturity Inventory (Form A-1, Attitude Scale), McGraw Hill, Inc., Monterey, CA, 1973.

APPENDIX A

List of Project Teachers and Schools

Teacher	School	Location
Dean P. Kile	Benton Area	Benton (replaced by Tom Lane, Lower Dauphin, after 1st year)
Doyle E. Paul	Berlin-Brothersvalley	Berlin
Wayne Seely	Canton	Canton
Charles Mostoller	Conneaut Valley	Conneautville
Leverne A. Barrett	Conrad Weiser	Robesonia
Carl E. Hoffer	Cumberland Hills	Pittsburgh
Mike Morgan	Mon-Valley	West Mifflin
Joseph Knapp	Curwensville	Curwensville
Sylvia M. Buckey	Derry	Derry (replaced by Ken Rhodes after her death in spring of 1973)
Randall G. Campbell	Derry	Derry (replaced by Don Fretts after 1st year)
Raymond Carey	Eisenhower	Russell
H. F. Longwell	Elderton	Elderton
Joseph C. Ondrey	General McLane	Edinboro
Darrell E. Major	Hazleton AVTS	Hazleton
Harold L. Cameron	Huntingdon	Huntingdon
Thomas L. Willis	Jefferson-Morgan	Jefferson
Bruce L. Witmer	Juniata-Mifflin AVTS	Lewistown
Charles Huffman	Liberty	Liberty
Richard D. Moore	Lower Dauphin	Hummelstown (moved to Cedar Crest High School, Annville, after 1st year, but continued in the project)
Scott A. Gold II	Oxford	Oxford
Jerry F. Longwell	Redbank Valley	New Bethlehem
Quentin A. Hine	Somerset	Somerset
Richard D. Stumpf	United	Armagh
Joseph J. Very	Williamsburg	Williamsburg
R. Ronald Gray	York County AVTS	York

For the most part these teachers continued throughout the project. The only changes were that Dean Kile dropped out after the first year. He was replaced by Tom Lane at Lower Dauphin High School. Richard Moore moved from Lower Dauphin to Cedar Crest, Annville, but stayed in the project. Sylvia Buckey died during the Spring of 1973. She was replaced by Ken Rhodes. Don Fretts replaced Randall Campbell at Derry after the first year. Hence, 22 of the 25 teachers initially selected remained with the project until it was completed.

APPENDIX B

Ornamental Horticulture Task Sheets

NP-1	Digging Bare-root Trees
NP-2	Digging Balled and Burlapped Shrubs
NP-3	Root Pruning Trees
NP-4	Preparing Soil for Planting Nursery Stock
NP-5	Lining Out Nursery Stock
NP-6	Mixing Soil on a Potting Bench (Table)
NP-7	Mixing Soil with a Concrete Mixer
NP-8	Mixing Soil on Floor Using a Wheelbarrow to Measure Volume
NP-9	Steaming Soil
NP-10	Mixing Fertilizer with Soil
NP-11	Removing Rooted Cuttings From A Propagation Bench
NP-12	Transplanting Rooted Cuttings Into Pots
NP-13	Putting Pots Into Place After Planting
NP-14	Transplanting From Pots to Containers
NP-15	Composting Soil
NP-16	Soil Sampling
T-3	Marking a Baseball Field
T-4	Marking a Football Field
T-5	Hole Changing and Ball Mark Repair on Golf Greens
T-6	Soil Preparation for Seeding or Sodding
T-7	Seeding Turfgrass
T-8	Laying Turfgrass Sod
T-10	Dethatching
T-16	Mulching a Turfgrass Seeding
T-17	Painting Turfgrass Equipment
T-20	Sharpening and Balancing Rotary Power Mower Blades
LC-5	Building a Patio Bench
LC-6	Constructing Brick Walks Without Mortar

APPENDIX C

Electric Wiring Skill Task Sheets

Job: Installing the Service Entrance

Skill 1 Installing the Meter Socket
2 Drilling hole for Conduit Entrance
3 Installing the 100 Amp Service Panel
4 Connecting Conduit to Top of the Meter Socket
5 Placing Conduit from the Meter to the 100 Amp Service Panel
6 Cutting and Ripping Insulation from Ends of Cable
7 Installing the Masthead and Pushing Cable into Conduit
8 Installing Cable from the Meter Socket to Service Panel and Connecting Cable to the Service Panel
9 Grounding the Service Entrance

Job: Installing Circuits

1 Installing the Junction Box
2 Installing Receptacle Boxes
3 Installing Switch Boxes
4 Mounting an Octagon Box in Ceiling
5 Connecting 120 Volt Circuit Cable to Service Panel
6 Installing Cable from Service Panel to Junction Box
7 Running Cable from Junction Box to Receptacle Boxes
8 Running Cable from Receptacle Boxes to Switch Boxes
9 Installing Cable from Switch Box to Ceiling Outlet Box
10 Connecting Cable to the Ceiling Outlet and the Two Three-Way Switch Boxes
11 Installing Receptacle Outlets
12 Connecting Wire to Single Throw Switch
13 Connecting Wires to Ceiling Outlet
14 Hooking up Three-Way Switches to Ceiling Outlets
15 Install a 220 Volt Circuit from the Service Panel
16 Mounting a 220 Volt Receptacle and Connecting It to the Cable Coming From the Panel Box
17 Installing a 30 Amp Panel Box
18 Running Cable from the Main Panel Box to 30 Amp Box

Beginning with Number 9 the original Task Sheets have been revised with new titles.

9 Running Wire - 15A Circuit 120v
10 Running Wire - 20A Circuit 120v
11 Running Wire - 20A Circuit 240v
12 Running Wire - 30A Circuit 240v
13 Running Wire - 60A Circuit 240v
14 Service Panel Breaker Connections
15 Receptacle to Receptacle Wiring 120v

16 Receptacle to Receptacle - 240v Split Circuit.
17 240 Appliance Wiring
18 30 Amp Disconnect & Utility Receptacles
19 Switch to Light 120v Circuit
20 Junction Box to Light and 3-Way Switch
21 3-Way to 3-Way Switch
22 Receptacle to Switch Wiring
23 Light Switch to Hot Receptacle

APPENDIX D

Electric Motor Task Sheets

Task 1 External Cleaning Electric Motor
2 Lubricating an Electric Motor
3 Reversing a Split-Phase Motor
4 Reversing A Multiple Voltage Electric Motor
5 How to Read the Nameplate
6 Selecting the Right Replacement Motor
7 Properly Mounting an Electric Motor
8 Disassembly of the Electric Motor
9 Cleaning the Electric Motor
10 Inspecting and Replacing Brushes
11 Replacing the Re-set Switch
12 Re-Assembly of Electric Motor
13 Replacing the Switch on the Electric Motor

APPENDIX E

INSTITUTE - DISADVANTAGED PROJECT

July 31 - August 4, 1972

Program

Agricultural Education
The Pennsylvania State University
301B Agricultural Administration Building

Monday, July 31

Morning Session

8:30 - 9:00 Registration - 301B Agricultural Administration Building
Barbeque tickets - $2.50

9:00 - 10:00 Opening Session

Keynote Speaker: Earl Copus, Jr., Director
Melwood Horticultural Training Center, Inc.
Upper Marlboro, Maryland

10.00 - 10:15 Question and answer period

10:15 - 10:30 Coffee Break

10:30 - 11:00 Conference objectives: Dr. Samuel M. Curtis
Agricultural Education
The Pennsylvania State University

11:00 - 12:00 Occupational Guidance Survey: Myra Collura
Graduate Assistant

12:00 - 1:30 Lunch - on your own

Afternoon Session

1:30 - 2:30 Film: "The Mind of Man"
4 parts - 120 minutes

2:30 - 2:45 Coffee break

2:45 - 3:45 Film: "The Mind of Man" (continued)

3:45 - 4:30 Reaction panel to film: Chairman: Quentin Hine
H. F. Longwell
R. D. Moore
Doyle Paul
Thomas Willis

Dinner - on your own

7:00 Dessert and open house at Curtis'

Tuesday, August 1

Morning Session

8:30 - 10:30 A Teacher Behavioral Observation Experiment:

Dr. John Withall
Professor of Education
The Pennsylvania State University

10:30 - 10:45 Coffee Break

10:45 - 11:45 Communicating with the Disadvantaged:

Dr. R. S. Brubaker
Speech Department
The Pennsylvania State University

12:00 - 1:30 Lunch

Afternoon Session

1:30 - 2:00 Plans for Next Year: Dr. Samuel M. Curtis
Willie Adams - electric motor unit

2:00 - 4:30 A Summary of Curriculum Materials
A Work Session with Curriculum Materials
Revision of Curriculum Materials
this session with graduate assistants:
Taylor Byrd - Nursery Production - 112 Armsby
James Curtis - Quality Milk - 301B Ag. Administration
Freddie Richards - Basic Electricity - 301A Ag. Adm.

Dinner - on your own

Wednesday, August 2

Morning Session: Occupational Opportunities for the Disadvantaged

8:30 - 9:00 Agricultural Interest Inventory: Dr. Samuel M. Curtis

9:00 - 10:00 Presentation and Discussion of Occupational Guidance Materials: Myra Collura

10:00 - 10:15 Coffee Break

10:15 - 12:00 Resource Materials for Teaching Disadvantaged - divide into groups

Emphasis on Rural Manpower Center:
"Meeting the Needs of Disadvantaged Students in Vocational Education" with Taylor Byrd, James Curtis, and Freddie Richards

"Motivating Disadvantaged Students in Vocational Education" with Willie Adams and Jan Bartoo

"Counseling Disadvantaged Students in Vocational Education" with Myra Collura

"Successful Methods and Techniques for Teaching Disadvantaged Students in Vocational Education" with Dr. Samuel M. Curtis

12:00 - 1:30 Lunch - on your own

Afternoon Session

1:30 - 2:45 Summary of this year's testing and testing for next year: Opinionnaire with Dr. Samuel M. Curtis
School Sentiment Index with Jan Bartoo
Semantic Differential with Taylor Byrd
Nelson-Denny Reading Test with Taylor Byrd
Testing Results from Curriculum Materials with T. Byrd, J. Curtis, and F. Richards

2:45 - 3:15 Demonstration of new equipment: Slide-on-sound
Super 8 film loop projectors
Sound-O-Matic

3:15 - 3:30 Coffee Break

3:30 - 4:30 How to Make Film Loops: Marilyn Luke
Instructional Services

Optional Tour of Graphics Lab - 15 Instructional Services

Dinner - on your own

Thursday, August 3

Morning Session

8:30 - 10:00 What are the Administrative Problems of Working with Disadvantaged?

Benjamin Turner
Deputy Superintendent
Harrisburg City Schools

10:00 - 10:15 Coffee Break

10:15 - 11:30 Reaction Panel on Ways to Work with or Around Administrative Problems:

Chairman: Dr. T. Dean Witmer
Special Emphasis Programs
PA Department of Education

Benjamin Turner
Leverne Barrett
Harold Cameron
Charles Huffman
Wayne Seely

11:30 - 12:30 Lunch - on your own

Afternoon Session

12:45 - 4:30 Field Trip to Selinsgrove State School - Lillian Cole, Director (transportation provided)

6:30 - 9:00 Chicken Barbecue
New Beaver Field Picnic Area

Friday, August 4

Morning Session

8:30 - 9:30 Motivational Techniques for Working with Educationally Disadvantaged Students:

Dr. Alan Kazdin
Psychology Department
The Pennsylvania State University

9:30 - 10:30 Filmstrip on Motivation

10:30 - 10:45 Coffee Break

10:45 - 12:00 Panel Discussion on How Do I Teach the Disadvantaged?:

Chairman: Sylvia Buckey
Carl Hoffer
Michael Morgan
Scott Gold
Ronald Gray
Joseph Very

12:00 - 1:30 Lunch - on your own

Afternoon Session

1:30 - 2:30 Cooperative Work Experience:

John Weaver
Coordinator - Pupil Services
North Montco AVTS
Lansdale, Pennsylvania

2:30 - 3:00 What I As a Teacher of the Disadvantaged Have Gathered from this Week's Program:

Chairman: Dr. Samuel Leadley
Rural Sociology
The Pennsylvania State University

Raymond Carey
Joseph Ondrey
Charles Mostoller
Jerry Longwell
Dean Kile

3:00 - 3:15 Coffee Break

3:15 - 3:45 Closing Speaker: James Perine
Assistant Dean
College of Human Development
The Pennsylvania State University

3:45 - 4:30 Expense Accounts

DISADVANTAGED PROJECT INSTITUTE
July 17-18-19, 1973
Room 301B, Agricultural Administration Building

Program

Tuesday, July 17

8:30 a.m.	Conference Registration
9:00	"Motivating the Disadvantaged to Stay in School," Mr. Thomas Crane, Butler Area School District
	Question Panel: Wayne Seely, Ronald Gray, Charles Mostoller
10:00	Break
10:30	"Developing Work Attitudes," Joseph Mitchell, Richard Barnard, Melwood Horticultural School, Upper Marlboro, Md.
	Question Panel: Carl Hoffer, Tom Lane, Robert Kramer
Lunch	
1:30 p.m.	"Motivating the Disadvantaged to Work," Dave Simpson, Sheltered Workshop, Gettysburg.
	Question Panel: Mike Morgan, Darrell Major, Richard Moore.
2:45	Presentation of Project Materials
	1. Ornamental Horticulture Task Sheets, Slides, and Film Loops - Dr. Curtis. 2. Electric Motors - Willie Adams, Graduate Assistant 3. Quality Milk - James Stutzman, Graduate Assistant
4:00	Formation of Committees to Work on Review and Revision of Instructional Materials
	Basic Electricity and Electric Motors - Dr. Williams, Willie Adams, Charles Mostoller -- Co-chairmen
	Dairy Nutrition - Prodeep Paul, James Stutzman, Charles Huffman -- Co-chairmen
	Ornamental Horticulture - Dr. Stinson, Dennis Milhoan, Carl Hoffer -- Co-chairmen

Wednesday, July 18	
8:00 - 10:00 a.m.	Committee Work on Curriculum Materials
10:00	Break
10:30	Reports on Results of Research
	Teacher Attitude Scale - Dr. Curtis Interest Inventory - Prodeep Paul
	1st year results - Dr. Curtis 2nd year results - Prodeep Paul
Lunch	
1:15 p.m.	"Working with the Disadvantaged," James Smith, York AVTS
	Question Panel: Scott Gold, Tom Willis, Joe Ondrey
3:00	Break
3:15	Analyzing the Reading Level of Curriculum Materials
	Discussion and Analysis - Ed Brown, Graduate Assistant
6:00	Picnic - Curtis Residence
Thursday, July 19	
8:30 a.m.	"Environmental Education in Disadvantaged Programs," George Ward, Instructor, Physical Education
	Question Panel: Jerry Longwell, Ray Carey, Richard Stumpf, Quentin Hine
10:00	Break
10:15	Reports of Committee Work on Curriculum Materials Review and Revision
Lunch	
1:00 p.m.	Writing Disadvantaged Projects for Local Districts, Wayne Grubb and Dr. T. D. Witmer, Special Emphasis, Pennsylvania Department of Education
3:00	Filling Out Expense Accounts