EDUCATION IN AGRICULTURAL OCCUPATIONS FOR THE EDUCATIONALLY DISADVANTAGED

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Congress has given vocational education considerable responsibility for the disadvantaged and handicapped in our society. In agricultural education, we have accepted that responsibility (Towne, 1972, Walker, 1971), as attested to by many research and program development projects (Oaklief, 1971). Historically, however, a sufficient number of agricultural teachers have experienced too many problems and too many failures to really feel "good" about teaching disadvantaged youth.

The research project from which this article is derived was designed to improve the educational environment for high school aged educationally disadvantaged learners (Curtis, 1974). The results of the project, particularly in the area of curriculum development, clearly demonstrate that improvement is possible. Instructional materials can be developed that are appropriate for educationally disadvantaged students without adversely affecting the performance of more advantaged youth. Although the total project involved other issues, the remainder of this article is directed toward this specific observation.

To avoid confusion, it is necessary at this point to clearly define the type of student served by the project. The educationally disadvantaged student is defined by who he is and by who he is not. The operational definition used was "any student two or more years behind his grade level in basic skills and unable to succeed in school because of this deficiency" (Grubb, 1971). Mentally handicapped youth were excluded from this definition. Hence, trainable mentally retarded (TMR) and educable mentally retarded (EMR) youth were not part of the project. Students involved were enrolled in regular agricultural classes in either high school or vocational-technical school programs.

Experimental Design

To evaluate the instructional materials developed in the project, it was necessary to identify the educationally disadvantaged student. A coding system was used to preserve the anonymity of every student, whether disadvantaged or not. Nelson-Denny reading test scores, school grade point average, and vo-ag class grade average were used for student classification purposes. Experimental instructional materials were compared with existing materials and disadvantaged student performance was compared to average and above average student performance. Analysis of variance and covariance were used to test for differences. Figures 1 and 2 illustrate the experimental design for evaluating the instructional materials.

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Student Group	Independent Variable	Treatment	Dependent Variables
Disadvantaged			
Average	pretest	Experimental Materials	Performance and/or Achievement tests
Above Average			

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

Treatment	Independent Variable	Dependent Variable
Experimental Materials - included visual aids, performance objectives	pretest	Performance and/or Achievement tests
Traditional - varied with specific unit but included theory, workbooks		

Figure 2. Experimental design for comparing experimental materials with traditional materials.

Discussion of Results

In the preparation of the instructional materials, it was decided that upon the recommendation of the project advisory committee the following five-point framework be used.

1. Written materials would deal with sequential tasks common to entry level occupation.
2. Manipulative skills commonly performed by workers in selected occupations would be emphasized.
3. Format would be task oriented to include behavioral objectives and a step-by-step procedure for accomplishing the task.
4. Instructional aids would be developed/identified to assist in the instruction of each task.
5. Reading level would be equivalent to the sixth grade norm.

The first step in evaluating the experimental instructional materials was to compare the materials with other approaches to teaching the subject matter. Tables 1, 2, and 3 illustrate the comparisons made with the nursery production, electric wiring, and quality milk production instructional materials respectively.

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[b]
Manual	108	14.8[a]	5.6
Outline	80	11.4	6.1

[a]Significantly higher at the .01 level than students taught by the outline method.

[b]Significantly higher at the .01 level than students in both other groups. Tested by analysis of covariance and Duncan's Modified (Bayesian) Least Significant Difference Test.

In Table 1, the nursery production task sheets are compared with the Nursery Production manual (Stinson, 1971) and with an outline of the material to be taught. Analysis of variance results of student achievement and performance test scores illustrates the superiority of the experimental materials. In terms of student performance, the students taught by the task analysis procedure scored significantly higher (.01) than students taught by the other methods. Where the criterion measure was a multiple choice achievement test, there was superiority of the task analysis approach over the outline. No significant differences were noted between the instructional manual and the task analysis, however.

On the electrical wiring material, student scores on both the performance and the achievement test scores were significantly in favor of the experimental material (Table 2). On the performance test the scores of students taught by the experimental materials was clearly superior to either of the other methods tested. Note that on the electrical wiring performance test, the lower the score, the better the performance.

Table 2. 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 .01 level by analysis of variance.

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

In both examples; i. e., nursery production and basic electricity, the superiority of the experimental materials prevailed for all students tested.

With the quality milk production unit, a similar type comparison of instructional materials was made for disadvantaged students only, except that in this instance the complete experimental package was compared to partial package. Certainly the data in Table 3 indicate that complete instructional packages are preferable--at least for disadvantaged students.

Table 3. Disadvantaged student achievement test scores by type of instructional materials.

Description of material	N	Pretest	Grade point average	Adjusted test
Experimental unit including behavioral objectives and slides	29	17.3	1.7	27.0[a]
Experimental unit with slides minus behavioral objectives	16	16.9	1.6	22.1

[a]Significantly higher at the .01 level. Tested by covariance.

It was essential to compare the effect of the experimental project material on educationally disadvantaged students performance in relation to more advantaged students. Again, this was done in each of the three subject matter areas. For electrical wiring and quality milk production, the experiment was replicated three times. The nursery production data are printed in Tables 4 and 5 for achievement and performance test scores, respectively. In each instance there were no significant differences among the three student classification groups.

Table 4. 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	15.2
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 5. Nursery production performance test scores by student classification groups.

Student Classification	N	Mean G. P. A.	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.

In two of the three replications with the quality milk material, the disadvantaged student scored significantly lower than the above average student (Table 6). These results are different from the nursery production results just discussed and the electric wiring data shown next. This apparent discrepancy in results is explained by the nature of the instructional material. Fewer manipulative type skills were indigenous to the quality milk unit than either of the other two. Likewise, more reading was required.

Table 6. 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 2					
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 3					
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.

Table 7. 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 2					
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 3					
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.

Adjust basic electricity test scores in replications 1 and 2 were not significantly different for the three student classifications (Table 7). In replication 2 the test scores before adjustment showed the disadvantaged student scores to be significantly lower. Covariance was not used in replication 3 of quality milk and basic electricity because pretest with step-down regression did not account for a significant portion of the variance.

These data illustrate the superiority of the experimental materials over the conventional materials with which they were compared. More importantly, they were effective in providing instruction in occupational tasks for all achievement level of students.

Summary

Project results illustrate that teachers can experience success when teaching disadvantaged youth. Appropriately prepared instructional material can effectively blunt at least two areas of student disadvantagement; namely, low reading level and low student motivation. With the reading barrier removed, apparently much of the disadvantagement disappears (Byrd, 1972). Secondly, where instruction centered on task oriented occupational skills, student interest heightened. These two factors explain to a large degree the success of the experimental materials. One limitation of this study is that it related to occupational skills for entry level jobs only. At this level the more advantaged youth were not hampered in their learning. As long as opportunity is provided for students to move to more advanced tasks as rapidly as they are capable, advantaged as well as less advantaged students should benefit from instructional materials such as those evaluated in the project. Key ingredients seemed to be reading level, instructional aids; task orientation, and performance objectives. Regardless of occupational level, these factors are important to teacher educators when designing instructional packages.

Literature Cited

Towne, D. C. and S. Wallace. Vocational Instructional Materials for Students With Special Needs, Northwest Regional Educational Laboratory, Portland, Oregon, 1972.

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

Oaklief, Charles. Review and Synthesis of Research on Vocational and Technical Education, The Ohio State University, Columbus, 1971.

Curtis, S. M. Education in Agriculture for the Educationally Disadvantaged, Final Report, Teacher Education Series, Volume 15, Number 1, The Department of Agricultural Education, The Pennsylvania State University, University Park, Pennsylvania, 1974.

Stinson, R. F., et al. Nursery Production, Teacher Education Series, Volume 12, Number 4s, 1971.

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