

AN EVALUATION OF GEORGIA'S AGRICULTURE IN THE CLASSROOM PROGRAM

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Abstract

This study sought to determine the effectiveness of Georgia's Agriculture in the Classroom Program. The study was conducted using an experimental posttest only control group design. Sixteen classes of second grade students and twelve classes of fourth grade students participated in the study. A total of 598 subjects were included. An instrument consisting of multiple choice exams was designed for each grade level. The length and difficulty level of the instrument were set by experts in the field of elementary education. The instruments were piloted tested and adjusted accordingly. The curriculum was taught to the treatment group during a six weeks period. At the completion, both the control and treatment group were given the exams. Results indicated that the program was effective in teaching agricultural concepts whether the groups were in rural or city settings, or when grouped by ability or randomly distributed. No significant differences were found between scores of second graders whose teachers were raised on a farm and those whose teachers were not. Significant differences occurred between control and experimental groups when all the teachers had little or no agriculture experience.

In recent years, agricultural educators have stressed the need for a populace who are better informed about agriculture. According to the National Research Council (1988), approximately two percent of the nation's population live on a farm. This contrasts with 30% in 1920 and 15% in 1950. Most of today's elementary school children are at least two generations away from first hand knowledge of agriculture (Farm Bureau Federation, 1983). A Texas study of the needs teachers have for implementing programs of agricultural literacy revealed that almost all of the fourth grade teachers surveyed had an inaccurate perception of agriculture (Terry, Herring, & Larke, 1990). Studies in Kansas (Horn & Vining, 1986) and Virginia (Oliver, 1985) indicated a lack of basic knowledge about agriculture among elementary school students. A conclusion of the National Research Council's study of agricultural education in the United States (1988) was: "Most Americans know very little about agriculture, its social and economic significance in the United States, and

particularly, its link to human environmental quality."(p.9) The study recommended that "All students should receive at least some systematic instruction about agriculture beginning in kindergarten and first grade and continuing through twelfth grade" (p.10).

The United States Department of Agriculture (USDA) recognized this problem when in 1981 it began a program called Agriculture in the Classroom, which was aimed at providing training and teaching materials for elementary teachers to incorporate agricultural concepts into their instruction. In the state of Georgia, the program began in 1983, as a cooperative effort between the State Farm Bureau and the State Department of Education. At the time the program began in Georgia, 47 states had developed materials for use in the program. The overall goal of the program was to teach children where food and fiber comes from and the importance of agriculture to the economy (Farm Bureau Federation, 1983). As

specific objectives were written, units of instruction for each unit were developed for the objectives. Curriculum for grades K through four was intended as a means to integrate agricultural concepts into the regular curriculum. The concept was that, as the basic skills were taught, agricultural examples could be used as illustrations. Representatives of education and agriculture developed and pilot tested the materials and prior to implementation, teachers received inservice training on how to use the material. The recommended time for teaching the curriculum was six weeks.

Since the curriculum was first taught in 1987 and had never been evaluated, project personnel decided that the effectiveness of the program should be examined. A search of the literature failed to identify any previous attempt to evaluate the Agriculture in the Classroom Program in any of the states.

Purpose and Objectives

The overall purpose of the study was to determine whether the curriculum being taught in Georgia through the Agriculture in the Classroom Program was accomplishing the Program's objective of teaching elementary students about agriculture.

The specific objectives of the study were to determine:

1. the effectiveness of the state's Agriculture in the Classroom Program in teaching agricultural concepts to second and fourth grade students.
2. the influence school location (in a rural or city area) had on the effectiveness of teaching agricultural concepts.
3. the influence teacher experience in agriculture had on the effectiveness of teaching agricultural concepts.

4. the influence student ability grouping had on the effectiveness of teaching agricultural concepts.

Procedures

The research was conducted using an experimental posttest-only control group design. According to Gay (1976), this design is superior to the pretest-posttest design when the treatment is of a relatively short nature and problems with mortality are not likely. Likewise, the Solomon Four Group Design is not considered to be superior unless mortality of subjects is anticipated. Fourteen schools were selected to participate in the study. Schools were chosen that would represent the different geographical areas of the state. Schools were also chosen from the major cities to represent urban areas and from rural areas to represent rural populations of students.

A treatment group and a control group were used in each school. This gave a total of 28 classes (16 classes of second grade and 12 classes of fourth grades) that participated in the study. The second and fourth grades were selected for the study because these were the first curricula developed and had been in use longer. Control and treatment groups were paired in the same school using similar groups. The treatment was the teaching of the Agriculture in the Classroom materials to the elementary school students. Control groups received the same curriculum except for the materials used in the Agriculture in the Classroom Program. Teachers in the treatment group had all been trained in the use of Agriculture in the Classroom materials; teachers in the control group had received no training in the use of these materials and did not use the materials in their teaching.

Teachers were contacted by telephone to secure their agreement in assisting with the research. They were given instructions both by mail and by telephone on how to proceed with the research. The total number of participants was 346

second graders (8 classes in the control group and 8 classes in the treatment group) and 252 fourth graders (6 classes in the control group and 6 classes in the treatment group). One class in the fourth grade treatment group failed to complete the study, thus reducing the effective number of fourth grade treatment groups to five.

The instruments consisted of a 20 item multiple choice test for the fourth grade and a 10 item multiple choice test for the second grade. The tests were developed by the researchers and reviewed by a panel of experts consisting of teacher educators, Agriculture in the Classroom Project personnel, Agricultural Education graduate students, and second and fourth grade teachers. The panel was given the curriculum and the objectives of the project and asked to determine if the test items indicated whether or not students had obtained the concepts outlined by the objectives of the project and if the questions were appropriate for the grade levels.

Suggestions from the panel were incorporated into the tests. Both the length of the exam and the difficulty level were designed to deal with the complications encountered in examining second and fourth graders with an exam that they could understand and at the same time be valid. The length and the difficulty level were set by experts in elementary education who served on the panel for the instrument development.

The instruments were pilot tested using second and fourth grade students who were not a part of either the treatment group or the control group. After incorporating the suggestions gained from the first pilot test, the instrument was pilot tested a second time to ensure the understandability and validity of the test. Reliability for the applicable portions of the tests was moderately high at .76 for Cronbach's alpha. Acceptance level was set at alpha level .05

The same regular, basic curriculum was taught to all of the treatment and control groups during the same six week period. The concept behind the Agriculture in the Classroom curriculum was that agricultural concepts be taught by using examples to illustrate topics in the regular curriculum. The treatment group was taught using the agricultural examples integrated into the regular curriculum. The control group was taught using the same curriculum but without the integration of the agricultural concepts.

When the units were completed, the teachers of both the treatment and control groups were given the exams to administer to their students. In order to help control for differences in reading ability, the teachers were asked to read each exam question to the class but not to make any further comment. The exams were returned to the researchers and the data were analyzed using the t-test.

Table 1. t-Values For Scores of Control and Treatment Groups

		N	Mean	t-Value	Alpha
Second Grade:	Treatment	171	7.152	5.29	.000
	Control	175	6.297		
Fourth Grade:	Treatment	120	14.642	6.50	.000
	Control	132	11.727		

Results

Objective one: *Determine the effectiveness of*

the state Agriculture in the Classroom Program in teaching agricultural concepts to second and fourth grade students. The exams of all groups were

scored and tested using the t-test. As indicated on Table 1, in both the second grade and the fourth grade, the treatment groups scored significantly higher on the exams ($p < .05$ level for the second grade and $p < .05$ level for the fourth grade group). The means represent the average of the number of questions answered correctly on the exams.

Objective two: *Determine the influence of school location (in a rural or city area) had on the effectiveness of teaching agricultural concepts.* The scores of classes from the major cities in the state were tested (t-test) against the scores of classes from rural areas. In both the city and rural settings, the treatment groups scored significantly higher than did the control groups (Table 2). Significance levels were: second grade rural groups, $p < .05$; second grade city groups, $p < .001$; fourth grade rural groups, $p < .002$; and fourth grade city group, $p < .05$.

Objective three: *Determine the influence teacher experience in agriculture had on the effectiveness of teaching agricultural concepts.* On

a brief questionnaire, the teachers were asked to indicate their level of experience with agriculture. As Table 3 indicates, no significant differences were detected between the control and treatment groups of second grade classes whose teachers indicated that they had been raised on a farm.

Fourth grade control groups did not have teachers who were raised on a farm, so no comparisons could be made. The data indicated that significant differences ($p < .05$ level for the second grade and $p < .05$ level for the fourth grade) were found between the control group and the treatment groups of classes whose teachers indicated they had little or no agricultural experience. In each instance the treatment group scored higher than the control group.

Objective four: *Determine the influence student ability grouping had on the effectiveness of teaching agricultural concepts.* Teachers were asked to indicate whether the students were assigned to their rooms based on ability or random assignment. When analyzed using the t-test, the

Table 2. t-Values of Control and Treatment Groups Compared by Location

	N	Mean	t-Value	Alpha
Second Grade Rural				
Treatment	88	7.182	3.61	.000
Control	86	6.372		
Second Grade City				
Treatment	83	7.120	3.84	.000
Control	89	6.225		
Fourth Grade Rural				
Treatment	72	14.500	3.20	.002
Control	65	12.508		
Fourth Grade City				
Treatment	48	14.854	6.08	.000
Control	67	10.970		

Table 3. t-Values of Control and Treatment Groups Compared to Teacher Experience in Agriculture

	N	Mean	t-Value	Alpha
Second Grade Raised on Farm				
Treatment	29	6.940	1.25	.214

Control	79	6.532		
Second Grade Little Experience				
Treatment	117	7.308	4.79	.000
Control	47	6.064		
Fourth Grade Raised on Farm				
Treatment	54	—	—	—
Control	0			
Fourth Grade Little Experience				
Treatment	66	12.742	.36	.001
Control	42	1-.452		

Table 4. t-Values of Control and Treatment Groups Compared by Student Ability

	N	Mean	t-Value	Alpha
Second Grade Random				
Treatment	78	6.961	3.25	.001
Control	65	6.154		
Second Grade Ability				
Treatment	93	7.312	3.54	.001
Control	88	6.500		
Fourth Grade Random				
Treatment	66	12.742	2.33	.021
Control	100	11.450		
Fourth Grade Ability				
Treatment	54	16.963	7.34	.000
Control	32	12.594		

data indicated significant differences in the scores of control and treatment groups for both second and fourth grades when compared in terms of assignment by ability and by random assignment (Table 4).

Significant differences were found between the treatment and control groups regardless of method of class assignment; ($p < .05$ for the second grade randomly assigned group; $p < .05$ for the second grade ability assigned group; $p < .05$ for the randomly assigned fourth grade group; and $p < .05$ for the ability assigned group). In each case the treatment group out scored the control group.

Conclusions /Recommendations

1. The main rationale for conducting the study

was to evaluate the program. Based on the findings of the study, the state Agriculture in the Classroom Program was effective in teaching the agricultural concepts as outlined in the study to elementary students. The only variable that showed no significant differences was that of the teachers who were raised on farms. The program did not appear to make a difference among classes whose teachers were raised on a farm; however, the data indicate that the program made a difference among students whose teachers had little or no farm experience. Teachers who were raised on a farm probably already used agricultural examples based on their background. The state Agriculture in the Classroom Project should be continued with continuing emphasis on educating teachers

about agricultural concepts. The lack of significant differences between the control and treatment groups whose teachers were raised on a farm implies that the knowledge level of the teacher is an important factor in the teaching of agricultural concepts. This is further supported by the significant difference between the scores of the treatment and control classes whose teachers had little or no experience in agriculture.

2. The program was effective in both the rural and city settings. This seemed to indicate that even though students lived in a rural area, they still learned about agriculture. It further indicates that students who live in a rural setting don't necessarily know about agriculture. Agricultural literacy is an issue in both rural and city settings.
3. The program was effective whether students were randomly assigned to classes or assigned according to ability. This seemed to indicate that students can grasp agricultural concepts regardless of ability level.
4. Research should be continued on a longitudinal basis to determine the long range effectiveness of the curriculum. Although this research revealed that the curriculum made a difference, there is a need to determine the long term retention rate of the concepts after the students have reached high school and beyond. Also, because of the

limited number of schools involved in the study, caution should be used in generalizing beyond the groups studied. An on-going evaluation process should be implemented for all schools using the program.

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