

# **An Evaluation of Horticulture Inservice Instruction in Fruit and Vegetable Production for Vocational Agriculture Teachers**

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Effectiveness of teacher inservice is of concern to those who plan inservice activities, those who attend them and those who pay for them. Teacher inservice programs continue to be a method for delivering technical information to teachers (Berman & Friederwitzer, 1981), but several questions remain unanswered. To what extent do teachers use the materials from the inservice programs? To what extent do teachers make changes in their teaching plans after attending inservice programs? Are there differences related to teacher and student characteristics, school facilities, and curricular offerings between those who attend inservice programs and those who do not? The question remains--do teacher inservice programs make a difference?

Studies of inservice education for teachers have attempted to identify the characteristics of effective inservice activities (Berman & Friederwitzer, 1981). Often, there have been conflicting views on the efficacy of training. Neil (1985) found that 75% of teachers categorized inservice education experiences as "fair to bad." Often there is a problem with transfer of training to classroom practice (Showers, 1985).

It can be difficult to measure the impact of an inservice activity; objectives may be broad, changes may be slight, follow-up may be difficult. A horticulture inservice program at Iowa State University had characteristics that facilitated a followup measurement of its effectiveness: specific focus on a relatively new topic and materials specifically designed to help an instructor develop a new unit of instruction.

The inservice topic was fruit/vegetable production and marketing. Recent declines in values for traditional crops and subsequent problems on the farm have led to increased interest in developing alternative crop production enterprises in Iowa. Among the more promising crops that have been identified as potential alternatives for corn and soybeans are fresh vegetables and fruits.

An inservice program on fruits and vegetables for vocational agriculture instructors had the potential for encouraging more horticulture semester courses. Single topic semester courses might appeal to non-traditional students, i.e., girls and non-rural students, and thereby increase total enrollment in vocational agriculture.

Supervised occupational experience (SOE) and adult programs might benefit from instructor attendance at the fruit/vegetable inservice program. Vocational agriculture instructors are frequently consulted by farm managers and others as they assess available production alternatives. Teacher access to sound technical information related to production and marketing of horticultural crops is critical (Rallis & Bucchi, 1981).

## Objectives

The major purpose of the study was to assess the effect of inservice education on curricular change. Specific objectives were:

1. To determine if there was a significant difference in implementation of fruit/vegetable instruction into the curriculum between instructors who attended a one-day horticulture inservice activity and instructors who did not attend.
2. To determine if there was a significant difference in demographic characteristics between instructors who attended and those who did not.
3. To identify the reasons why instructors did not implement instruction in fruits/vegetables.

## Methods and Procedures

The population for the study included 365 high school and post-secondary vocational agriculture teachers in Iowa during the 1985-86 school year. There were 269 high school vocational agriculture instructors and 96 who were teaching at the post-secondary level.

One hundred sixty-nine instructors chose to attend the fruit/vegetable horticulture inservice activity held June 20, 1985, at the Iowa State University horticulture farm. The one-day workshop included a number of stops at demonstration plots around the farm. Horticulture professors and extension specialists stationed at each stop explained cultivation and propagation of fruits or vegetables grown there and answered questions from the instructors. Local growers and an economist emphasized marketing importance and procedures for effective marketing. Each instructor received a comprehensive notebook containing detailed lesson plans and supplementary materials which would aid in teaching fruit/vegetable units.

For the purposes of the study, the population was divided into those who attended the fruit/vegetable inservice workshop and those who did not attend. The two groups self-selected themselves. A follow-up study of both groups was done near the end of the school year following the fruit/vegetable workshop. Inservice workshop attendees were assigned to Group I, and nonattendees were assigned to Group II. Samples of the teachers representing each group were randomly drawn, resulting in sample sizes of 63 for Group I and 52 for Group II. The composite sample consisted of 115 teachers.

A questionnaire was designed to determine whether and to what extent teachers had implemented horticulture units that included fruit/vegetable production and marketing. It also assessed demographic characteristics of the teachers and schools in which they taught. The questionnaire was tested for validity with instructors who were not a part of the sample group.

Fifty-one of the sixty-three people who attended the inservice returned the questionnaire for a response rate of 81%. Forty of the 52 persons who did not attend returned the questionnaire for a response rate of 77%. Overall response rate to the questionnaire was 79%. This response rate was achieved after two contacts by mail.

The Chi-square Test of Independence was used to test for an association between characteristics of the two sample groups, attendees and non-attendees. Frequencies and the Independent  $\chi^2$  test were used to

analyze selected demographic data. The  $\chi^2$  test was used to test for differences in selected variables even though the two groups self-selected themselves by their attendance or non-attendance at the inservice. According to Hinkle, Wiersma and Jurs (1979), such analysis can be used if inferences are extended to other populations on a logical rather than a statistical base.

### Findings

Of those teachers who attended the inservice workshop, 43% taught fruits and vegetables as part of a horticulture unit during the subsequent school year (Table 1). Twenty percent of the teachers who did not attend the inservice workshop taught fruits and vegetables during the same time period. This finding was significant at the .05 level.

Table 1

Frequencies, Percentages and Chi-Square Values for Attendees and Non-Attendees by Characteristics Related to Horticulture

Characteristics	Non-Attendees n=40	Attendees n=51	Chi-Square	Prob.
Taught fruits and vegetables this year as part of a horticulture unit	8 (20%)	22 (43%)	4.434*	.035
Taught a fruit/vegetable unit this year for the first time	1 (3%)	9 (18%)	3.824*	.050
Instigated a new program (e.g. land lab) related to fruits/vegetables	3 (8%)	7 (14%)	0.260	.610
Taught a unit on horticulture this year which did not include fruits/vegetables	8 (20%)	10 (20%)	0.048	.827
Have a greenhouse for vo-ag use	8 (20%)	10 (20%)	0.048	.827
Have students with SOE programs related to fruits/vegetables	18 (45%)	36 (71%)	5.069*	.024
Number of teachers who took horticulture classes as an undergraduate	24 (60%)	28 (55%)	0.075	.784
Number of teachers who have attended fruit/vegetable training sessions	8 (20%)	27 (53%)	8.933**	.010

\*Significant at or beyond the .05 level. \*\*Significant at or beyond the .01 level.

Eighteen percent of the attendees taught fruits and vegetables for the first time in the academic year after the inservice workshop, compared to 3% of the non-attendees. Fourteen percent of the inservice workshop attendees instigated a new program related to fruits/vegetables (e.g., vegetables in a land laboratory) compared to 8% of the non-attendees.

Teachers who attended the inservice workshop reported significantly more ( $p < .05$ ) student SOE programs related to fruits/vegetables than did teachers who did not attend the inservice workshop. Of teachers who attended the fruit/vegetable inservice workshop, 53% had attended prior fruit/vegetable training sessions. Twenty percent of inservice non-attendees had previously attended fruit/vegetable training sessions. This finding was significant at the .01 level.

Teachers who chose not to teach fruits and vegetables as part of a horticulture unit were asked to identify from a list those reasons that applied specifically to their situation. Attendees and non-attendees ranked the first two reasons in the same order (Table 2). They were in agreement that (a) other topics deserved higher priority and (b) the teacher was not knowledgeable enough to teach the subject. Nonattendees at the fruit-vegetable inservice workshop listed a lack of relevant instructional materials as a major contributing factor in their decision not to teach the unit, whereas inservice participants did not generally perceive this to be a problem. Teacher perceptions that fruits and vegetables were irrelevant ranked last in importance with both groups of teachers.

Table 2

Reason Why Teachers Did Not Teach Units That Included Fruits/Vegetables

	Non-Attendees n=40	Attendees n=51
Other topics deserved higher priority	16 (40%)	10 (20%)
Teacher not knowledgeable enough to teach the subject	13 (33%)	8 (16%)
Relevant instructional materials were not available	12 (30%)	2 (4%)
Fruits/vegetables not perceived to be relevant	4 (10%)	2 (4%)
Plan to teach this unit next year	6 (15%)	17 (33%)

Teachers who attended the inservice workshop expressed more frequent intentions to include fruits/vegetables in future instruction than did teachers who were nonattendees. Teachers with plans to implement units which would include fruits/vegetables said they required additional lead time for planning and preparing of the new unit.

No significant differences were found between teachers who attended the fruit/vegetable inservice workshop and those who did not participate when the following factors were compared: school greenhouse, number of students, number of non-traditional students, number of horticulture classes taken as an undergraduate, and years of teaching experience (Tables 1 and 3).

Table 3

Means, Standard Deviations and t Values for Attendees and Non-Attendees by Demographic Characteristics of Secondary Teachers and Students

Characteristic	Non-Attendees	Attendees	t Value	Prob.
	n=39	n=48		
	Mean S.D.	Mean S.D.		
Years of vo-ag teaching experience	$\frac{9.18}{9.36}$	$\frac{9.85}{8.42}$	-.355	.724
Number of secondary vo-ag students	$\frac{43.67}{18.61}$	$\frac{39.19}{23.47}$	.993	.676
Number of non-farm, non-traditional secondary students	$\frac{17.15}{14.55}$	$\frac{14.79}{16.32}$	.713	.515

There were no significant differences between the two groups in teaching horticulture units without fruits and vegetables. The significant difference occurred in teaching fruits/vegetables, the topic which was the focus of the inservice activity.

#### Conclusions and Implications

The question "Does inservice education make a difference?" is of concern to many (Neil, 1985). The follow-up study of the 1985 Iowa horticulture inservice workshop for high school and post-secondary agriculture instructors indicated that the inservice activity appeared to make a difference in curricular offerings.

Vocational agriculture teachers who attended the fruit/vegetable horticulture inservice workshop tended to include instruction about fruits and vegetables in the horticulture units which they taught. Teachers who did not participate generally did not teach about fruits and vegetables. Attendees were more likely to have instigated new fruit/vegetable instruction.

Attendance at this particular horticulture inservice workshop was highly associated with attendance at other horticulture training sessions, while nonparticipants tended to refrain from participation in these and similar teacher learning activities. Additionally, teachers who attended horticulture inservice activities had students with fruit/vegetable SOE programs, whereas nonparticipating teachers generally did not.

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