

# Knowledge, Attitude, and Behavior of Minority Participants in a Summer Pre-College Workshop

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## Abstract

Many universities encounter considerable difficulty recruiting ethnic minorities to undergraduate food and agricultural sciences majors. Consequently, several authors have recommended that more proactive approaches be implemented. This case study focuses on one approach involving a pre-college workshop for high school students. The findings indicate that the participants acquired significant amounts of knowledge about the food and agricultural sciences. Also, a year after the workshop, the students' positive attitudes had been maintained and several positive academic behaviors were noted. Implications for practice were derived.

## Introduction

The need for more ethnic minorities (i.e., African Americans, Hispanics/Latinos, and Native Americans) to become involved in the food and agricultural sciences has been well documented (Bowman and Shepard, 1985; Larke and Barr, 1987; Henson, 1988; Hunte, 1992; Bowen, 1994; Rawls et al., 1994). In response to this need, a recent Food and Agricultural Education Information System report suggests that an upward trend may be emerging for B.S. enrollments (Litzenberg et al., 1996). From 1986 to 1992, minorities comprised 5-7% of the students in B.S. agricultural sciences, natural resource sciences, and related programs in U.S. institutions. However, from 1993-1995, the minority B.S. percentages increased to 10%, 12%, and 13%, respectively, even though the minority graduate numbers held constant at 8-9%.

Several authors have examined why few minority students pursue food and agricultural sciences (FAS) majors. Neyland (1990) indicated that African Americans do not pursue FAS degrees because: (1) of a strong disdain for agriculture, (2) the fact that many minorities have historically pursued graduate degrees in the food and agricultural sciences outside of the South, and (3) a decline in the number of African American farmers. Henson (1988) cited few incentives and role models to entice African Americans into professional FAS careers. Nichols et al. (1993) found that Hispanic and non-Hispanic high school agriculture students perceive the FAS quite differently. As opposed to non-Hispanics, Hispanic students perceived that agriculture has limited career potential and involves low technology, manual

labor, poor working conditions, only farming, and low pay. Hispanics also perceived that there were more barriers to their enrollment in higher education. Finally, many minority students equate FAS careers with farming or ranching which leads to negative perceptions rather than positive dimensions involving science or business (Orthel et al., 1989).

## The Problem

Undergraduates who pursue FAS majors must be proficient in the biological, physical, and related sciences. This academic necessity presents challenges for minorities who often do not enroll in college prep high school science courses. Further, the number of minorities preparing for FAS occupations suggests that traditional recruitment approaches have marginal success. For example, in fall 1994, minorities constituted 2% of the undergraduates in Penn State's College of Agricultural Sciences. Also, while minority enrollments increased nationally since 1992, Penn State's total remained constant (Wiley et al., 1995). This occurred even though various programs were created to focus on the physical, biological, and social science dimensions of the FAS.

These programs were created, in part, because many high schools lack the physical and human resources to develop an awareness of, and appreciation for, science-related programs (Dolce, 1984). Further, many educators, especially science teachers, have limited FAS knowledge. From a recruitment perspective, more effective programs are needed to increase enrollments and such programs should begin before the senior year in high school. Also, many colleges tend to generalize their recruitment approaches based on a traditional pool (i.e., the majority or dominant group). Such approaches create limited perspectives of constructs that shape the recruitment needs of minority students (Fisher and Griggs, 1995).

To overcome this situation, innovative approaches must be conceived based on educational psychology theories. For example, assumed relationships among knowledge, attitude, and behavior suggest that as a person becomes more knowledgeable of, and experienced in, an area such as the FAS, that person will perhaps gradually begin to associate positive connotations to that area and eventually behave in the desired manner (Swanson, 1972). In this case

study, a one-week workshop was assumed to provide the knowledge and experiences to change or enhance minority students' FAS attitudes which might lead to increased enrollments in the long term.

### **Purpose and Objectives**

In July 1994, Penn State's College of Agricultural Sciences conducted a one-week workshop to expose 10th and 11th graders to the science content found in FAS careers. A central tenet of the workshop was that such students would have at least two years of high school to finish courses needed to succeed in the College's majors. The workshop was conceived based on Swanson's (1972) theory wherein the students received the needed education and knowledge to form positive attitudes. Given the exploratory nature of this research, three questions were posed to examine Swanson's (1972) theory as it applies to minorities who are interested in the biological and physical sciences: (1) What types and levels of FAS knowledge did the students acquire during the workshop? (2) Did the workshop result in stable and positive FAS attitudes? (3) How did the workshop influence the students' behaviors one year after the workshop?

### **Methods and Procedures**

The exploratory nature of this study meant that experimental designs were inappropriate. Consequently, two pre-experimental designs that limit cause and effect inferences were used to answer the three questions. The one-shot case design was used for questions #1 and #3 to assess the students' knowledge and behavior after the workshop (Tuckman, 1994). For research question #2, Tuckman's one-group pretest-posttest design was modified to include a delayed posttest that was administered one year after the workshop to assess the stability of the participants' attitudes.

The study included 28 students who participated in the workshop at Penn State's main campus (University Park). The students were recruited using promotional materials mailed to 438 high school science teachers and guidance counselors in state's urban centers where most minorities live. All participants met four criteria: (1) they planned to attend college, (2) were interested in the biological or physical sciences, (3) had 3.00 or higher grade point averages, and (4) were recommended for the workshop by a science teacher or guidance counselor. Three freshmen, 11 sophomores, 13 juniors, and one senior participated in the workshop. During the 1995-96 academic year, the senior who participated in the workshop was enrolled in agricultural business at Penn State on full scholarship. The participants included 21 African-Americans, two Hispanic/Latinos, and five Asian-Americans. Most were females (17 of 28).

During the week when the workshop was held, the students participated in 8-5 p.m. sessions conducted by 46 faculty and staff from 11 of the College's 12 academic departments. The sessions included demonstrations, laboratory experiences, lectures, and field trips. Half-day sessions were organized around topics such as animal science, entomology, plant science, forest resources, horticulture, the social sciences, etc. The students also participated in recreational and social activities from 6-10 p.m. each day.

Three approaches were used to collect data to answer the questions. For question #1 (knowledge), the researchers created three take-home exercises with multiple choice and matching formats commonly used in high school classrooms. The objective exercises targeted the science dimensions of the FAS (20 items), Pennsylvania agriculture facts and figures (12 items), and major FAS scientists and professionals (16 items). The exercises were distributed a day before the content was to be taught. With the exercises in hand, the students got a glimpse of the next day's key content and concepts. All exercises had to be returned by 8 a.m. the day after the content had been taught. Data for question #2 (attitudes) were collected three times (during the Sunday night orientation, during the final session on Friday morning, and one year after the workshop). The students responded to 10 statements by circling strongly agree, agree, disagree, or strongly disagree. The instrument determined whether or not attitudinal changes had occurred and the direction and magnitude of any shifts. To collect data for question #3 (behaviors), the students completed an instrument with five items to assess their academic and FAS behaviors.

All instruments were reviewed for content and face validity by four Penn State agricultural and extension education faculty. Because the researchers wanted to assess permanency (attitudes) rather than short term perceptions as well as actual behaviors, the attitudinal delayed posttest and the behavior instruments were mailed to the 28 students one year after the workshop (July 7, 1995). The deadline for the instruments to be returned was July 21. Students who did not return the instrument within two weeks were called the week of August 7-11. With the aid of the telephone follow-ups, usable responses were received from all 28 participants.

To analyze data for question #1, a student's score on the three exercises was the number of items answered correctly. For question #2, the 10 item Likert-type instrument was interpreted as 1.00-1.74=strongly disagree; 1.75-2.49=disagree; 2.50-3.24=agree; and 3.25-4.00=strongly agree. The attitudinal data were analyzed with the repeated measures function of the SPSSr MANOVA procedure to study phenomena over time (Kennedy and Bush, 1985). Frequencies were used to assess question #3 (behaviors). For analysis purposes, the students were considered a "slice of life" sample of Pennsylvania's minority students (Oliver and Hinkle, 1981).

## Results

Findings for research question #1 (knowledge) included an average score of 89% for the three exercises (Table 1). Of the three exercises, the highest score was 94%

for the significant FAS figures exercise. The students averaged 90% on the science dimensions exercise and 83% for the Pennsylvania agriculture facts and figures exercise.

Table 1. Knowledge Assessments of Workshop Participants (n=28)

Exercise	# of Items	# of Items Correct	%
Science Dimensions of the FAS	20	18	90%
Pennsylvania Agriculture Facts and Figures	12	10	83%
Significant FAS Figures	16	15	94%
Overall	48	43	89%

Research question #2 focused on the students' FAS attitudes (Table 2). The findings for five of the 10 items indicate that the participants started the workshop with positive attitudes that were maintained a year later. Stable, positive attitudes were found for items #2, #3, #4, #6, and #8 because no significant differences ( $p>.05$ ) were detected between the pretest, posttest, and delayed posttest. In addition to these five items, for item #5 the Exact F detected significant differences ( $p<.05$ ) among the pretest, posttest, and delayed posttest means. However, the differences between pairs of means were too small to achieve significance ( $p>.05$ ). Thus, the participants were unstable in their attitude about personally knowing someone who has an FAS career.

For two other items, the workshop resulted in positive attitudinal shifts that were maintained on the delayed posttest. As indicated by the pretest, when the workshop began the students agreed that they knew little about FAS careers (item #1) and that the food and agricultural sciences involve primarily farms with crops and animals (item #7). At the end of the workshop, the posttest means indicated that they had changed their perceptions and disagreed with both statements. Also, the delayed posttest means indicate that the positive shifts were maintained a year later.

Finally, before the workshop began, the students strongly agreed that FAS careers touch the lives of people each day (item #9) and that the U.S. is very dependent on people who work in the FAS (item #10). At the end of the workshop, the participants held even stronger positive views about both items. However, a year later, the delayed posttest indicated that their attitudes had regressed to the less positive levels observed on the pretest.

In terms of their academic and FAS behaviors, 17 of

the 28 students were enrolled in a college preparatory program and 25 planned to attend a 4-year college (Table 3). Also, 14 students indicated that the workshop influenced their course selections during both 1994-95 and 1995-96. Finally, three of the students were considering FAS careers. The student who graduated in 1995 had already enrolled in agricultural business at Penn State.

### Implications for Practice

The findings suggest that the students acquired significant experiences in and knowledge about (1) the science dimensions of the FAS, (2) significant FAS figures, and (3) Pennsylvania agriculture facts and figures. Also, the findings support previous research about pre-college programs resulting in positive attitudes (Bowman and Shepard, 1985; Bowman and Bowen, 1987; Gardner, 1991; Rawls et al., 1994). The findings further imply that the students came to the workshop with mostly positive attitudes that were maintained a year later. Also, after the workshop, the participants felt that they knew more about FAS careers and that they had expanded their FAS concepts beyond farms with crops and animals. In terms of behaviors, most students planned to attend college. Finally, even though the workshop influenced their high school course selections, few of the students were now presently committed to pursuing FAS majors. However, most of the students were taking the high level courses needed for biological and physical science disciplines, including FAS majors. Four conclusions are based on the findings:

1. Students who participated in the pre-college workshop learned significant amounts of content.
2. The participants' attitudes were positive and stable after a year. Also, on two items (#1 and #7), even more positive attitudes resulted that were maintained a year

Table 2. Pre, Post, and Delayed Posttest Mean Attitudes of Workshop Participants (n=28)

Item	Pretest M/(SD)	Posttest M/(SD)	Delayed M/(SD) <sup>a</sup>	Exact F
1. I know very little about jobs or careers in the food and agricultural sciences.	2.88 (.75)	1.96 (.68)	2.12 (.59)	11.94 <sup>b</sup>
2. Most careers in the FAS involve outdoor work in fields.	2.30 (.87)	2.00 (.73)	1.92 (.74)	1.81
3. Courses in biology and chemistry are not needed for most careers in the FAS.	1.69 (.81)	1.37 (.63)	1.61 (.57)	2.92
4. Growing up on a farm is necessary for a career in the FAS.	1.55 (.85)	1.44 (.89)	1.53 (.58)	.02
5. I personally know someone who has a career in the FAS.	1.78 (1.01)	2.33 (1.17)	2.54 (.95)	3.64 <sup>b</sup>
6. There are few businesses in PA where I can have a professional career in the FAS.	2.10 (1.03)	1.63 (1.01)	2.10 (.74)	1.00
7. When I hear the words FAS, I usually think of farms with crops and animals.	2.93 (.83)	2.18 (1.00)	2.23 (.77)	10.41 <sup>b</sup>
8. When I hear the words FAS, I seldom think of laboratories and testing equipment.	2.52 (.98)	2.00 (.76)	2.11 (.65)	2.25
9. Careers in the FAS touch the lives of people each day.	3.50 (.51)	3.85 (.46)	3.35 (.56)	9.29 <sup>b</sup>
10. The U.S. is very dependent on people who work in the FAS.	3.30 (.67)	3.67 (.62)	3.31 (.55)	5.54 <sup>b</sup>

a - M=Means; SD=Standard Deviations; (Means based on 1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree scale).

b - Sig. difference ( $p < .05$ ) among 3 means based on Hotelling's trace criterion with 2,26 df.

\_\_\_\_ - Sig. difference ( $p < .05$ ) between pretest and posttest means;

..... - Sig. difference ( $p < .05$ ) between posttest and delayed posttest means.

Table 3. Academic and Career Behaviors a Year After the Workshop (n=26)<sup>a</sup>

Item	Yes	No	Not sure
Enrolled in college preparatory program?	17	8	1
Planning to attend college?	25	1	0
Workshop influenced 1994-95 high school course selections?	14	7	5
Workshop influenced 1995-96 high school course selections?	14	12	0
Considering a career in the FAS?	3	21	2

<sup>a</sup> - Two students did not respond.

- after the workshop.
- As indicated by their high school course selections, the students now realize the importance of the biological and physical sciences to the FAS.
  - Significant recruitment approaches are needed to persuade the students to pursue FAS majors.

Based upon the findings, observations made during the workshop, and related research, three recommendations for practice were developed:

- Colleges of agricultural sciences should institute pre-college programs to provide the knowledge and experiences that enable minority students to make informed FAS decisions.
- Colleges of agricultural sciences should work closer with teachers, counselors, and administrators in schools with high minority enrollments to enable students who may be interested in FAS majors to complete appropriate courses and experiences.
- Workshop participants should be tracked to assess long term influences on choices of majors.

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