

ASSESSING STUDENT ATTITUDES TOWARD ANIMAL WELFARE, RESOURCE USE, AND FOOD SAFETY

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Abstract

The purpose of this study was to determine if participation in a program addressing contemporary issues in animal agriculture had an effect on the students' attitudes towards animal welfare, resource use, and food safety. The students in this study were participants in the Pennsylvania Governor's School for Agricultural Sciences (PGSAS). Within the five-week PGSAS program, students completed a two-week unit titled "Contemporary Issues in Animal Agriculture."

Three main issues were examined: animal welfare, resource use, and food safety as they relate to animal agriculture. The students ranked food safety as the primary concern with resource use second, and animal welfare third. Scholars with agricultural backgrounds rated specific issues as more beneficial to society than did scholars without agricultural backgrounds. Within the food safety area, both groups identified microbial contamination as the primary issue of concern. With regard to resource use, deforestation was ranked first, and in the animal welfare area, the pre-course issue of greatest concern was providing shelter. Upon completion of the course, within the animal welfare area, animal transportation became a topic of increased concern for both groups. Overall results showed decreased concern after the course by both groups of scholars.

Introduction

Many authors (e.g. Coulter, 1985; Mallory & Sommer, 1986; NRC, 1988; Walter & Reisner, 1994; Terry & Lawver, 1995) have alluded to the current low level of agricultural literacy and the relatively poor image of agriculture from both production and vocational standpoints. A few of the factors contributing to this low level of literacy could be the small percent of today's population, approximately 2%, involved in production agriculture (Utah Department of Food and Agriculture, 1997) and the access to agricultural educational programs in secondary schools. According to The Center for Rural Pennsylvania

(1997), 35% of the state's high schools and vo-tech schools offer courses in agriculture. Many of these programs are vocational rather than academic, focusing on students who are planning to enter the workforce directly from high school, rather than those students preparing for college.

The animal:human bond is another factor in determining perceptions of animal use for food, fiber, and services by the non-farm citizenry (Selby & Rhoades, 1981; Brown, 1985). For segments of the public who have no agricultural experience, the ownership and care of companion animals are their only direct experiences with animals. This lack of distinction between companion animals and farm

animals may affect the attitudes of the public toward using animals for food, fiber, services, and research.

The animal rights movement has also played a role in shaping the attitudes of the public towards the use of animals for agricultural and scientific research (Jamison & Lunch, 1992). A lack of agricultural literacy can lead to the questioning, by the public, of animal production methods, animal well-being in farm animal systems, environmental impact, utilization efficiency of resources in agriculture, and safety of the food supply (Guither & Curtis, 1983; Jamison & Lunch, 1992). This questioning in turn can affect public policy. If agencies are influenced by media-induced public pressure instead of objective scientific information, the effects on public policy can be negative (Smith, 1998). Terry & Lawver (1995) inferred that laws and regulations regarding agricultural endeavors would be more favorable if Americans had a higher level of literacy. Kellert (1985) identified the age group of 13 - 16 years of age as those who broaden their ethical concerns, their ecological appreciation of animals and the natural environment, and their cognitive, factorial understandings and knowledge. Therefore, middle school and high school students would be forming and broadening their ethical concerns about animals and the environment, which are two primary components of modern-day agriculture.

Animal and environmental issues also reveal value-based judgments, depending on rural and urban backgrounds of the students. Research shows that urban students with little or no agricultural experience are less likely to offer opinions about agricultural issues than rural students or those with agricultural experience (Walter & Reisner, 1994). Reisner (1992) indicated that, overall, rural students' opinions reflected the views expressed by the animal industry and urban students were more questioning of conventional agricultural production practices.

Purpose and Objectives

The objectives of this study were to determine if there were differences in attitudes among the PGSAS students with regard to their agricultural backgrounds. Three areas were investigated:

1. Examination of the levels of concern about contemporary issues in animal welfare, resource use, and food safety,
2. Identification of specific issues of concern as they relate to animal agriculture,
3. Determination of changes before and after a two-week course in contemporary animal issues.

Methodology

Sample and Instrumentation

The data for this study were collected from surveys distributed to students enrolled annually from 1996 through 1998 (three years) in the Pennsylvania Governor's School for the Agricultural Sciences (PGSAS). Student participation was limited to one year. Each year pre- and post-course surveys were administered to the 64 PGSAS scholars participating in the two-week "Contemporary Issues in Animal Agriculture" course that was a mandatory part of their core animal science curriculum. A total of 192 students completed the survey over the three-year period. The participants in this study represented a specialized population and no sampling techniques were applied. The results therefore cannot be generalized to a larger population, but the intent was to show general trends and provide baseline data for additional investigation in this area.

Students attending PGSAS were chosen through an intensive selection process. This

process involved the Pennsylvania Departments of Education and Environmental Protection and Penn State University's College of Agricultural Sciences (Fivek & McCormick, 1998). Coordinators from these units were responsible for the promotion of PGSAS within their districts through informational programs, press releases, and by working with guidance counselors to recruit students. For the 1997 and 1998 programs, PGSAS recruiters also distributed applications to county extension offices, guidance counselors, and high schools with agricultural education courses and FFA programs. The assistant to the state director for the Pennsylvania Governor's School for Excellence then reviewed completed applications and the state selection committee made final decisions.

The questionnaires were developed with the assistance of a specialist in program evaluation and instrument development in Penn State's College of Agricultural Sciences (Bennett & Wilson, 1992). The questionnaires used for the current study were revised and tested periodically since the development of the original instrument. Researchers administered pre- and post-course written questionnaires to determine attitudes and perceptions of PGSAS scholars about contemporary issues in animal agriculture.

Participants in the course were given the pre-course survey during the PGSAS orientation. During the two weeks that followed, students engaged in discussions and hands-on activities based on current issues, concerns, and management practices of the livestock industries (beef, dairy, horse, swine, and veal). Course materials covered such topics as resource use, food safety, handling and transportation of farm animals, animal nutrition, housing, and waste management as it relates to animal agriculture. The materials presented in the course attempted to cover both sides of issues, with particular attention to science-based information as opposed to presenting only pro-active, agriculturally-oriented

aspects. Discussions with role-playing scenarios of controversial issues were presented by the scholars and critiqued by the scholars and staff from the Department of Dairy and Animal Science.

Upon completion of the two-week course, participants were given a post-course survey to assess the effectiveness of the course and its impact on the scholars' attitudes and perceptions. Students were asked in the pre- and post-course surveys about their agricultural experience, age, and gender, which served as demographic characteristics. The decision to use pre- and post-course surveys was based on prior studies that indicated this is an effective method in determining trends in studies predicting change (Fesseden & Porter, 1959; Nordstrom, et al., 1999).

Data analysis

Descriptive statistics, including percents, frequencies, and means were obtained. In both the pre- and post-course surveys, students were asked to respond to attitudinal questions. A combination of Likert scale (strongly disagree to strongly agree) and ordinal level data were used to rank their concerns. Scale results were summarized using frequencies, percents, and means for various animal agricultural issues and were crosstabulated with agricultural experience. The effects of agricultural experience on differences in the pre- vs. post-survey results were also determined.

Results and Discussion

Three animal agriculture issues were explored within the scope of the course; animal welfare, resource use, and food safety as they relate to animal agriculture. Within these three main topics, related sub-topics were also discussed. The students' overall ranking in terms of greatest importance and concern was food safety. This was true for all students. Resource use was ranked second, and animal welfare was ranked third (Table 1).

Table 1. Student Attitudes Based on Agricultural Experience

	Students without agricultural experience			Students with agricultural experience		
	Pre-course	Post-course	Change	Pre-course	Post-course	Change
Food Safety						
Major/moderate problem	60.3	33.3	-27.0	73.6	58.7	-14.9
Minor problem	18.6	41.2	22.6	10.6	25.3	14.7
Not a problem/a benefit	28.5	37.3	8.8	12.3	19.2	6.9
Not sure	5.3	3.5	-1.8	12.3	6.4	-5.9
Resource Use						
Major/moderate problem	39.1	14.2	-24.9	56.8	34.0	-22.8
Minor problem	20.5	23.4	2.9	14.2	24.5	10.3
Not a problem/a benefit	42.9	61.3	18.4	23.1	35.3	12.2
Not sure	5.6	2.2	-3.4	11.7	7.0	-4.7
Animal Welfare						
Major/moderate problem	30.6	20.6	-10.0	53.5	42.5	-11.0
Minor problem	18.6	31.1	12.5	14.2	25.5	11.3
Not a problem/a benefit	48.0	51.6	3.6	18.6	31.3	12.7
Not sure	7.9	1.5	-6.4	17.1	4.0	-13.1

Note. Negative numbers represent a decrease in the percent of students who upon completion of the course perceived the issues as less of a problem/benefit/not sure.

Average percents for each of the five possible responses (e.g. 1=major/moderate problem, 2=minor problem, 3=not a problem/a benefit, and 4=not sure) are presented for the pre- and post-course surveys. Pre-course survey percents were subtracted from the post-course survey percents to obtain the difference, which represents the change in the perceptions of the students. The responses are also presented by students with and without agricultural experience, to determine if changes in pre- vs. post-survey results were influenced by agricultural background. Averages over the specific issues within general areas of concern (animal welfare, resource use, and chemical food residues) are presented in Table 1 to allow comparisons of the three general areas of concern.

The pre-survey data indicated that 60.3% of students without agriculture experience and 73.6% of students with agriculture experience thought food safety was a major or moderate

problem. Students ranked resource use second (39.1% and 56.8% without and with agricultural experience, respectively); animal welfare was third (30.6 and 53.5 % without and with agricultural experience, respectively). After taking the course, the students indicated all three categories (food safety, resource use, and animal) were less problematic (a decrease for students with no agricultural experience of 27.0%, 24.9%, and 10.0%, respectively, and for agricultural-experienced students of 14.9%, 22.8%, and 11.0%, respectively).

Food Safety

Using a scale from 1 to 10, 1=major problem, 10=minor problem (Table 2), all scholars ranked microbial contamination as the major problem among food safety issues on both the pre- and post-surveys. Students without agricultural experience ranked freshness of the product and storage/cooking methods as the second and third

Table 2. Student Ranking of Animal Agricultural Issues Based on Agricultural Experience

	Students without agricultural experience		Students with agricultural experience	
	Pre-course	Post-course	Pre-course	Post-course
Food Safety				
Microbial contamination ^a	1	1 ^c	1	1
Freshness ^a	2	2	4	3
Storage/cooking ^a	3	1 ^c	3	2
Use of pesticides	4	4	2	4
Use of growth promotants	5	3	5	5
Soil additives	6	6	6	7
Use of herbicides ^a	7	7	7	6 ^c
Use of antibiotics	8	5	8	6 ^c
Resource Use				
Deforestation for grazing ^a	1	1	1	1
Disposal of animal waste	2	2	2	2
Grazing practices	3	5	3	3
Recycling of by products	4	3	4	4
Use of water for animals	5	4	5	5 ^c
Use of grains for feed	6	6	6	5 ^c
Animal Welfare				
Providing shelter	1	2	1	1
Animal health	2	4	6	4 ^c
Treatment of animals	3	5 ^c	4	4 ^c
Animal housing	4	3	3	4 ^c
Processing (harvesting)	5	5 ^c	2	2
Animal handling	6	5 ^c	7	5
Animal nutrition	7	5 ^c	5	5
Animal transportation	8	1	9	3
Castration	9	6	10	7
Dehorning	10	7	8	6
Tail docking ^b	11	8	11	8

^aMissing cases not included.

^aIncluded in 1996 survey only. ^bIncluded in 1997 and 1998 survey only, ^cTopics tied for same ranking.

highest concerns. In the post-survey, storage/cooking methods tied with microbial contamination as their primary concern, freshness remained second, and use of growth promotants moved up to fifth place. For students with agricultural experience, use of pesticides and storage/cooking methods were ranked second and third, respectively, in the pre-survey. In the post-survey storage/cooking methods moved to second

place, freshness moved to third, and use of pesticides dropped to fourth place. Use of soil additives, herbicides and antibiotics were all ranked as relatively minor problems by all of the students in the pre-post surveys. Pre-survey results indicated storage and cooking was ranked third for both groups, and concern in this category increased for both groups after taking the course. Adequate storage and cooking procedures have

been emphasized as ways to prevent microbiological contamination of consumed foods.

Resource Use

All students ranked deforestation, disposal of animal waste, and grazing practices of greatest concern prior to the course (Table 2). These rankings remained the same after the course with the exception of grazing practices, which dropped to fifth for those students without agricultural experience. Both groups ranked the use of water for animals and grains for feed as being of least concern (5th and 6th, respectively).

Included in the course was a visit to the Penn State University Swine Center where the scholars were given a presentation on collection and disposal of animal waste, including the mentioning of “waste spills” which have occurred from large swine enterprises and the precautions that swine producers should take to prevent such incidences. The students were also given materials from the NPPC (1995) that contained comprehensive science-based information on the nature of swine wastes as well as specific guidelines for handling these wastes to reduce potential environmental contamination. Disposal of animal wastes ranked second in areas of concern in the post-course survey.

Animal Welfare

Animal transportation and animal handling techniques were addressed in publications distributed to the scholars based on suggested principles (Grandin, 1993), and were demonstrated with sheep using several different handling aids. Handling and transportation were also demonstrated using yearling steers and a cattle trailer. Handling and transportation issues are associated since transported animals also have to be handled (loaded and unloaded). It appears that transportation was not given much consideration before the course, and the course materials and

demonstrations created an awareness of possible problems.

In the pre-survey, providing shelter was the primary concern for all students. The post-survey results were the same, except that providing shelter dropped to second place for students with no agricultural experience. Animal health and treatment of animals were ranked second and third by the students with no agricultural experience in the pre-survey, while processing (harvesting) and animal housing were ranked second and third by students with agricultural experience. In the post-survey the ranking of processing remained the same; animal housing dropped to fourth place and animal transportation moved into third place. There was a similar, but more dramatic change in the ranking of animal transportation for students without agricultural experience, which moved up from ninth place to being their primary concern.

Of the three animal manipulations (dehorning, castration, and tail docking) discussed, pre-course results showed dehorning and castration were perceived as more serious concerns than tail docking by both groups. All of these procedures were accompanied by a discussion as to the reasons for the procedures. The perceptions of dehorning, castration, and tail docking as major problems may be due to a combination of concerns relating to pain and distress of the animals, as well as questioning the validity of the reasons the procedures are performed. Post-course results indicated a decreased concern for both groups of scholars in all three categories.

Perceptions of Different Industries

The different industries (beef, dairy, horse, sheep, swine, and veal) were ranked by the students on a scale from 1 to 3; 1 =very concerned, 2=concerned, and 3=slightly concerned (Table 3). Pre-course results showed that, regardless of agricultural background, students had the greatest

Table 3. Mean Scores of Student Perceptions of Various Animal Agricultural Industries

Industry	Students without agricultural experience			Students with agricultural experience		
	Pre-course	Post-course	Change	Pre-course	Post-course	Change
Dairy	1.14	1.27	0.13	1.48	1.55	0.07
Swine	1.92	1.97	0.05	2.13	2.31	0.18
Beef	1.95	1.85	-0.10	2.10	2.08	-0.02
Horse	2.06	2.01	-0.05	2.20	2.13	-0.07
Sheep	2.08	1.92	-0.16	2.19	2.42	0.23
Veal	2.09	1.99	-0.10	2.12	2.32	0.02
Average	1.87	1.84	-0.04	2.04	2.14	0.10

Note. Missing cases not included; mean score based on a scale of 1 to 3, 1=very concerned, 2=concerned, 3=slightly concerned. Three year averages.

amount of concern about the dairy industry. Students with no agricultural experience had the least amount of concern over the veal industry (2.09), and students with an agricultural background perceived the horse industry with the least amount of concern (2.20). Although the level of concern toward the dairy industry decreased slightly for both groups after the course, all students still viewed dairy as the industry for which they had the most concern. Over all industries, all students exhibited essentially no change (-0.04 for students without agricultural experience and 0.10 for students with agricultural experience) in their perception of the conduct of the industries.

Solutions of Practical Scenarios

On the last day of the contemporary issues class, the scholars proposed solutions to the scenarios which they had been assigned on the first day of the session. The 64 students were divided into groups of eight, with each group assigned two problems. The scholars did not have prior notice as to which one of the two scenarios would be presented. In most cases, presenting solutions to the scenarios was a team effort involving a skit and/or visual presentation aids. These presentations were highlights of the course for both scholars and staff. The discussions were educational and lively, and students benefited from

the sharing of ideas and viewpoints with others of different backgrounds (Mortenson, 1989).

Evaluation of Instructional Unit

The contemporary animal issues instructional unit as well as the other courses within the PGSAS are evaluated by students on a scale of 1 to 4 (4 highest) on several factors including appropriateness, level and amount of instruction, quality of instruction, use of examples, and demonstrations. The contemporary animal issues course was ranked with a score of approximately 3.8 or higher (on a 4-point scale) for each of the factors within each year. This indicates that the scholars were generally satisfied and challenged by the instruction and content of the course.

Conclusions

Generally, students with agricultural backgrounds exhibited slightly less concern about most issues than did scholars without agricultural experience, but the differences were not large in most instances. Regardless of the students' agricultural experience, there were generally increases (positive changes in perceptions) between pre- and post-course survey evaluations. This indicates that similar types of instructional materials, problem-solving exercises, and hands-on

activities would be appropriate for both types of students. Perhaps one of the most important findings from this study is that even students with agricultural backgrounds questioned specific management practices with regard to potential voids in food safety, resource use, and animal welfare. This indicated further that students with agricultural backgrounds are interested in critical self-assessment of production methods and concepts. As indicated previously, the materials presented in the course attempted to cover both sides of issues, with particular attention to science-based information as opposed to presenting only pro-active, agriculturally-oriented aspects. The importance of this became apparent after the presentation of a video provided by a commodity group that was clearly biased and one-sided. The students felt the information was not credible and therefore discounted it as "propaganda". When commodity groups and farm organizations provide educational or informational materials to the public, they should consider this possibility. Problems and areas in need of improvement in agricultural production methods should not be glossed over, but presented in a basic, realistic manner. If the public is to increase its agricultural literacy level, they need to have a basic understanding of all aspects of agriculture.

The survey results and positive evaluation responses indicate that agricultural education programs can provide the key to increased knowledge and dialogue related to animal and environmental impact issues. Further, the positive evaluation of the course suggests that agricultural and scientific literacy can be improved through instructional efforts that are both enjoyable and educational.

Recommendations

Because of the positive impact participation in the course had on the scholars, the PGSAS should be used as a model for other universities and colleges that have an agricultural

curriculum. A drawback of PGSAS is that participation is limited to only those students who show academic promise and an interest in agriculture. This limiting factor must be removed and agricultural education made available to all middle and high school students. Schools should be encouraged to merge agriculture, science, and technology (agriscience) and integrate it into their science curricula. This can be the first, and potentially the most important, step in educating students about agriculture. This will allow all students to expand their knowledge in agriculture and explore career options in agricultural fields. This knowledge will also help provide students with the necessary tools to make informed decisions about agriculture and the effects it has on both the environment and society.

References

- Bennett, M. B. & Wilson, L. L. (1992). The Influence of special instruction on perceptions/opinions of academically talented youth regarding farm animal welfare, care, and use. The Professional Animal Scientist, 8, 1-6.
- Brown, D. (1985). Cultural attitudes toward pets. Symposium on the Human-Companion Animal Bond. Small Animal Practitioner North American, 15(2), 3 1 1-3 17.
- Coulter, K. J. (1985). The agricultural image. NACTA Journal, 29(3), 19-22.
- Fivek, M. & McCormick, D. (1998). Annual report of the Pennsylvania School for the Agricultural Sciences. Sponsored by the Pennsylvania Department of Education and the State's Intermediate Units. The Pennsylvania State University, University Park, PA.

Fesseden, J. & Porter, W. (1959). Analysis and Interpretation. Evaluation in Extension. Pg. 1-7.

Grandin, T. (1993). Teaching principles of behavior and equipment design for handling livestock. Journal of Animal Science. 71, 1065-1070.

Guither, H. D. & Curtis, S. E. (1983) Changing attitudes toward animal welfare and animal rights: The meaning for the US food system. Extension Committee on Policy (ECOP), Michigan State University, East Lansing, MI.

Jamison, W. V. & Lunch, W. M. (1992). Rights of animals, perceptions of science, and political activism: Profile of American animal rights activists. Journal of Science, Technology, and Human Values. 17(4), 43 8-45 8.

Kellert, S. R. (1985). Attitudes toward animals: Age-related development among children. Journal Environmental Education, 16(3), 29-39.

Mallory, M. & Sommer, R. (1986). Student images of agriculture: survey highlights and recommendations. Journal of the American Association of Teachers in Education. 27 (4), 15-17.

Mortenson, J. H. (1989). Pennsylvania Governor's School for the Agricultural Sciences: Idea sharing session. NACTA Journal. 33(3), 25.

NPPC. (1995). Guide to Environmental Quality in Pork Production. National Pork Producers' Council, Des Moines, IA.

NRC. (1988). Understanding Agriculture - New Directions for Education. National Research Council, National Academy Press, Washington, D.C.

Nordstrom, P. A., Wilson, L. L., Richards, M. J., Fivek, M. L., Coe, B.L., & Brown, M. B. (2000). Student attitudes toward animal derived products and services and how they affect society and the environment. Journal of Agricultural Education. (In press)

Reisner, A. E. (1992). An activist press: The farm press's coverage of the animal rights movement. Journal of Agriculture and Human Values, 9, 38.

Selby, L. A. & Rhoades, J. D. (1981). Attitudes of the public towards dogs and cats as companion animals. North American Small Animal Practitioner. 22(3), 129- 137.

Smith, C. (1998) Responsible journalism, environmental advocacy, and the great apple scare of 1989. The Journal of Environmental Education, 29(4), 3 1-27.

Terry, R., Jr. & Lawver, D. E. (1995). University students' perceptions of issues related to agriculture. Journal of Agricultural Education, 36(4), 64-70.

The Center for Rural Pennsylvania.(1997). Pennsylvania AG Facts. [Brochure]. Harrisburg, PA: Pennsylvania General Assembly.

Utah Department of Agriculture and Food. (1997). National Ag Week Promotes Food and Farm to Students. Salt Lake City, Utah:

Walter, G. & Reisner, A. (1994). Student opinion formation on animal agriculture issues. Journal of Animal Science, 72, 1654-1656.