Urban High School Students' Perceptions about Agricultural Careers and General Agricultural Knowledge[1]

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Abstract

The Big City, Big Country Road Show (BC2BC) was a recruitment workshop for traditionally underrepresented inner-city high school students with little or no agricultural background. The workshop synthesized agricultural communications with activities emphasizing leadership, photography, writing, video production, and Web design to broaden students' perspectives of career opportunities in agriculture. The purpose of this study was to measure the influence of workshop participation on students' perceptions of careers attainable with an agricultural sciences degree and their general agricultural knowledge levels. Significantly more students perceived attainable agricultural careers, such as public relations officer, loan officer, account representative, Web designer, photographer, government official, and landscaper, after participating in the workshops. As workshop participants learned about the connections between agricultural subjects and careers, their perspectives about agricultural careers were changed. Significant differences in perceived knowledge levels were found; students perceived they knew less about agricultural subjects than did their peers after participating in the BC2BC workshops. Participants' pre- and post-workshop tested knowledge of agricultural facts revealed no significant differences. Future research should include a variety of agricultural knowledge assessment methods, procedures, and settings to better understand the role of increasing one's knowledge of agricultural facts and its possible effects on career decision making processes.

Introduction

Many children are not exposed to agriculture as a way of life (Esters and Bowen, 2004). To sustain the agricultural workforce, colleges of agriculture must invest in recruiting students to agricultural majors (Scott and Lavergne, 2004). Recruitment efforts are necessary, specifically with minority students, so that the agricultural workforce reflects the diversity of the U.S. population.

Minority students identified career perceptions and social status as barriers to pursuing careers in agriculture, as well as a lack of information about career opportunities (Outley, 2008). Such perceptions may influence underrepresented groups' participation in agriculture, contributing to a workforce population disproportionate to that of the general public. Hispanic/Latinos and African-Americans together comprised 10.2% of the USDA's workforce (USDA, 2007), and less than 10% (9.76%) of those same groups were enrolled in an undergraduate four-year, agricultural or related sciences degree program in fall 2006 (Food and Agricultural Education Information System, 2007). Reports compiled by the U.S. Census Bureau predicted that the Latino population, currently the largest minority in the U.S., will triple by the year 2050 (Passel and Cohn, 2008), making Latinos a significant population from which future agriculture professionals can be recruited (Mullinix et al., 2006).

According to White et al. (1991), urban youth thought that careers in agriculture were only for those who had an agricultural background, worked outdoors, and participated in on-the-job training. Other studies (Conroy, 2000; Newsom-Stewart and Sutphin, 1997) suggested that students equated agriculture with science, but not with computers, engineering, and teaching. Conventional extracurricular activities, such as 4-H and FFA, have not contributed to minority recruitment initiatives, since they

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are rarely housed in urban high schools. As colleges of agriculture work to confront this disparity, scholars (Conroy, 2000; Outley, 2008; Talbert and Larke, 1995; Wildman and Torres, 2001) have recommended that recruitment efforts should focus on biotechnology, communications, ecology, media portrayal, and/or urban horticulture to expand minority students' perceptions of agriculture, as well as build career knowledge and self-confidence. Marcelin et al. (2004) discussed programs that both engage and enrich minority student populations, and emphasized the importance of "project-based learning, technology, and role models" (p. 522) to help students build skills and knowledge. Having a positive attitude toward agriculture as a result of a pre-college workshop increased the likelihood of enrolling in an agricultural college major (Wiley et al., 1997).

The Big City, Big Country Road Show (BC2BC) was a multi-year program designed to introduce and recruit underrepresented urban high school students to careers in agriculture through experiential learning. Two-week workshops held in Houston, San Antonio, Atlanta, Chicago, and El Paso, focused on media representations of agriculture. Based on real-world contexts, the activities were team-oriented problem solving situations. Student teams met with local media professionals and produced communications media to advance their understanding of connections between modern agriculture and communications, economics, education, entertainment, and health. What makes BC2BC innovative is its use of communication technologies and strategies to engage students' interests in agriculture, compared to traditional techniques such as exhibitions and demonstrations. Ultimately, the BC2BC program provides a unique recruitment opportunity through experiential learning to change student attitudes about career opportunities in agriculture.

In their study of positive youth development programs, Catalano et al. (2004) asserted that programs fostering self-determination, self-efficacy, belief in the future, and opportunities for pro-social involvement, provided the greatest opportunity for positive attitudinal shifts. Roberts' (2006) model for the experiential learning process, drawing from the work of Dewey, emphasized the role of context and importance of "intelligent" activity, where one postpones action until observation and judgment have taken place. In Roberts' model, the learner first focuses on the experience, then reflects on the experience to draw generalizations. Once generalizations are formed, they are used to guide the next set of experiences, refining and focusing the generalizations until knowledge is produced from active participation. Contextual factors Roberts considered were "the level, the duration, the intended outcome, and the setting" (p. 26). Esters and Bowen (2004) shared an emphasis on context, discussing the influence of environment on factors influencing enrollment in an urban agricultural education program. Esters (2007) elaborated that once an environment provides opportunity for agricultural experience and career exploration, career choice satisfaction is likely.

This study evaluated the effect of workshop participation on underrepresented students' attitudes toward pursuing careers in agriculture and their levels of agricultural knowledge. Imperative to this study was the idea of attitudinal influences affecting choice, and how recruitment efforts, partially supported by contact with media professionals in experiential situations, best address those choices. Duncan and Broyles (2004) found that experiences gained in a hands-on program with professional involvement positively influenced students' choices toward agricultural majors.

Methods

The purpose of this study was to determine if high school students' participation in a summer agricultural communications workshop affected their perceptions of agriculturally-related careers and/or their agricultural knowledge levels. The objectives were to:

1. Determine students' perceptions of careers attainable with an agricultural degree;
2. Determine if significant differences existed in students' pre- and post- workshop perceptions of agriculturally-related careers; and
3. Determine if significant differences existed between students' pre- and post-workshop knowledge about general agricultural facts.

Similar descriptions of the methods and demographics exist for the larger project (Wingenbach, et al., 2007), and are described fully herein. Descriptive survey research using Web-based survey data collection methods (Ladner, et al., 2002) were used to complete the study, after obtaining approval from the Texas A&M University Institutional Review Board.

The population of interest included all inner-city high school students (grades 9 to 12) who were considered part of the underrepresented populations in agriculture and who lived in San Antonio and Houston (N = 55,264) during summer 2007; El Paso, Atlanta, and Chicago (N = 121,863) during summer 2008; and San Antonio (N = 17,792) during summer 2009. Project directors used a USDA definition (USDA-Grants-MSP FAQs, n.d.) of underrepresented populations, which included Hispanic and African American students. Selected schools in Houston, San Antonio, El Paso, Atlanta, and Chicago were selected for workshop sites because of their high enrollments of underrepresented populations (Houston = 59% Hispanic, 29% African American; San Antonio = 88% Hispanic, 9% African American; El Paso = 79% Hispanic, 5% African American; Atlanta = 4% Hispanic, 86% African American; and Chicago = 39% Hispanic, 47% African American).

Participants were recruited through promotional materials mailed to more than 500 high school

administrators, counselors, and teachers in Houston, San Antonio, El Paso, Atlanta, and Chicago. Two teachers from each city were selected to serve as workshop recruiters for their individual schools. Selected teachers taught core-curriculum classes in mathematics and science. By using core-curriculum teachers, the BC2BC project directors were able to contact students from a broad range of backgrounds and interests.

Students who were identified by teacher recruiters completed online applications, including demographic and personal information questions, for program participation. Not having demographic questions on the research instrument itself increased research participants' trust levels, as described by social exchange theory (Dillman, 2007). Each applicant received a unique code at the time of his/her online application. Codes were used to identify participants' pre- and post-responses to increase confidentiality. BC2BC administrators reviewed all student applications. Student selection criteria included grade level and interest in the BC2BC program. Not all students who applied for the summer workshops were selected to participate in the program.

The recruitment process produced an accessible population (N = 145) in Houston, San Antonio, El Paso, Atlanta, and Chicago, from which a purposive sample (n = 94) was derived. Of the 94 students selected to participate in the summer workshops, 30 did not complete all research elements in the BC2BC program, resulting in experimental mortality. Gall et al. (2007) defined experimental mortality as "losing research participants during an experiment because participants dropped out, missed pre- or post-testing, or were absent from one or more sessions" (p. 386). The final sample included 64 program completers for a response rate of 68%. Caution is warranted when attempting to generalize the results of this study to any other population of interest.

To achieve the research objectives, data were collected with researcher-developed questionnaires, adapted from Mitchell's (1993) instrument measuring Ohio State University minority students' knowledge, perceptions, and career aspirations related to agriculture. Texas A&M University and Texas Tech University faculty members participating in the BC2BC program evaluated the instrument for face and content validity.

Students' perceptions of agricultural careers and general agricultural knowledge were measured in individual sections. Students were asked to identify careers they perceived as attainable with an agricultural degree. Traditional (farmer, rancher, landscaper, etc.) and non-traditional (media personality, photographer, public relations officer, etc.) careers were included in the list of careers, which was adapted from Mitchell's (1993) instrument.

Students were asked to gauge their agricultural knowledge levels as (a) *I have less knowledge about agricultural subjects than my friends*; (b) *I have the same knowledge about agricultural subjects as my friends*; or (c) *I have more knowledge about agricultural subjects than my friends*. Following the measurement of perceived agricultural knowledge, students were tested, through ten multiple–choice questions, to measure their actual knowledge about general agricultural facts. Questions were loosely based on the Ag–knowledge section of the USDA's Agriculture in the Classroom Web site (Agriculture in the Classroom, n.d.). Example questions included (a) *Ethanol, an alternative fuel, cannot be produced from which of the following agricultural products* (biomass, sorghum, soybeans, corn); (b) *Hydroponic farming methods do not include* (soil, nutrients, water, plants); (c) *What communication method currently reaches the largest number of people worldwide* (books, newspapers, radio, television); and (d) *Which state is the largest producer of dairy products* (California, Wisconsin, New York, Pennsylvania).

The instrument was administered twice. Pre-tests were administered via email to students prior to their completion of online instructional modules. Workshop participants were sent personalized emails with the study's purpose, a survey hyperlink, and each student's unique code for entering the online survey. Students completed the pre-test from one to two weeks before the face-to-face agricultural communications workshop. The post-test (identical to the pre-test) was administered in person after the workshop. Each student entered his/her unique code into an online survey. Time between response sets ranged from 14 to 28 days. Four participants were absent during the post-test and despite repeated follow-ups, did not complete the post-test; those participants' pre-test responses were excluded from analyses. Findings should be generalized only to the respondent group (n = 64).

Data were analyzed using descriptive statistics. Paired sample t-tests, Wilcoxon non-parametric tests

Table 1. Student Participants' Demographic Profiles (n = 64)

Variable	Sub-group	f	%
Year	2007	27	42.2
	2008	24	37.5
	2009	13	20.3
Age	14	4	6.3
	15	22	34.4
	16	14	21.9
	17	23	35.9
	18	1	1.6
Race	Hispanic	46	71.9
	Black	12	18.8
	White	5	7.8
	Asian	1	1.6
Gender	Female	42	65.6
	Male	22	34.4
Grade	9th	17	26.6
	10th	20	31.3
	11th	26	40.6
	12th	1	1.6

were used to determine if significant differences existed in the variables of interest. A significance level of $\alpha = .05$ was established a priori.

Results and Discussion

Workshop participants were inner-city high school students ($n = 64$) from Houston, San Antonio, El Paso, Atlanta, and Chicago. Participants' ages ranged from 14 ($n = 4$) to 18 ($n = 1$) with an overall average of 15.92 ($SD = 1.01$) years. The majority of participants were Hispanic ($n = 46$), female ($n = 42$), and most ($n = 27$) participated in 2007 when they were sophomores or juniors ($n = 46$) at the time of their workshop (Table 1).

We were interested in knowing students' perceptions of careers attainable with an agricultural sciences degree and if significant differences existed between those perceptions in pre- and post-workshop settings (Table 2). The scores for the variables of interest were not normally distributed; therefore a Wilcoxon Signed Ranks Test (a non-parametric test of statistical significance) was used (Gall et al., 2007).

Significantly more students perceived viable careers that are attainable with an agricultural science degree, such as public relations officer, loan

Table 2. Students' Perceptions of Careers Attainable with an Agricultural Degree ($n = 64$)

	Pre-workshop		Post-workshop			Test Statistics[z]	
Careers	*f*	%	*f*	%	Diff.	*Z*[y]	*p*
Public Relations Officer	21	32.8	38	59.4	17	-3.71*	.00
Loan Officer	11	17.2	24	37.5	13	-3.15*	.00
Account Representative	21	32.8	34	53.1	13	-2.84*	.00
Web Designer	29	45.3	41	64.1	12	-2.68*	.01
Photographer	38	59.4	49	76.6	11	-2.29*	.02
Government Official	24	37.5	33	51.6	9	-2.06*	.04
Landscaper	36	56.3	44	68.8	8	-2.53*	.01
Engineer	33	51.6	41	64.1	8	-1.71	.09
Chemist	29	45.3	36	56.3	7	-1.70	.09
Media Personality	34	53.1	41	64.1	7	-1.70	.09
Zoo Director	36	56.3	42	65.6	6	-1.50	.13
Journalist	39	60.9	44	68.8	5	-1.29	.20
Teacher	35	54.7	38	59.4	3	-0.73	.47
Rancher	39	60.9	42	65.6	3	-0.90	.37
Farmer	39	60.9	40	62.5	1	-0.30	.76

Frequencies total more than 64 because students were allowed multiple responses.
[z] Wilcoxon Signed Ranks Test.
[y] Based on negative ranks.
*$p < .05$.

Table 3. Frequencies and Significance Tests for Students' Perceived Knowledge about Agricultural Subjects ($n = 64$)

		Pre-workshop		Post-workshop	
Knowledge Levels	Sub-categories	*f*	%	*f*	%
Perceived knowledge about Agricultural Subjects[z]	Less knowledge than my peers	3	4.7	19	29.7
	Same knowledge as my peers	29	45.3	10	15.6
	More knowledge than my peers	32	50.0	30	46.9
	Missing	—	—	5	7.8

Test Statistics[y]	Ranks	*n*	Mean Rank	*Z*	*p*
Post-workshop Perceived-Pre-workshop Perceived	Positive	16[x]	10.59	-2.46[x]	.01*
	Negative	19[w]	24.24		
	Ties	24[v]			
	Total	59			

[z] Respondents could only select one of three choices.
[y] Wilcoxon Signed Ranks Test.
[x] Post-perceived Knowledge > Pre-perceived Knowledge.
[w] Post-perceived Knowledge < Pre-perceived Knowledge.
[v] Post-perceived Knowledge = Pre-perceived Knowledge.
*$p < .05$.

Table 4. Frequencies and Significance Tests for Students' Tested Knowledge of Agricultural Facts (n = 64)

Knowledge Levels	Sub-categories	Pre-workshop f	Pre-workshop %	Post-workshop f	Post-workshop %
Tested Agricultural Facts[z]	Correctly answered = 50%	31	48.4	27	45.0
	Correctly answered = 51%	33	51.6	33	51.6
	Missing	—	—	4	6.3

Test Statistics[y]	M[x]	SD	Paired Differences M	Paired Differences SD	t	df	p
Pretested Knowledge	6.58	2.56	-0.50	1.06	-0.36	59	0.72
Post-tested Knowledge	6.63	2.61					

[z] Ten multiple-choice questions;
[y] Paired Samples t-Test.
[x] Test scores ranged from 1-10 correct in the pre- and post-test.

officer, account representative, Web designer, photographer, government official, and landscaper, after participating in the workshop (Table 2). Positive gains were indicated for other careers (engineer, chemist, media personality, zoo director, journalist, teacher, rancher, and farmer), but these gains were not statistically significant (Table 2).

We examined participants' perceived knowledge of agricultural subjects. Table 3 shows that in pre-test situations, a majority of students (50%) perceived they had "more knowledge" about agricultural subjects than did their peers. However, vastly more (25% increase) realized they had "less knowledge" about agricultural subjects than did their peers after students progressed from pre- to post-workshop settings (Table 3). Significant differences in perceived knowledge levels were found. Wilcoxon Signed Ranks Tests showed that significantly more students' "perceived" they knew less about agricultural subjects in post-workshop settings, than what they originally believed they knew about agricultural subjects prior to their workshop participation (Table 3).

Finally, we analyzed participants' tested knowledge of agricultural facts to find out if significant changes had occurred from their workshop participation. Participants' knowledge levels of agricultural facts were examined by the number of students who answered ≤ 50% of the test correctly, versus those who answered ≥ 51% correctly. The ≤ 50% group decreased slightly (3.4%) from 31 (48.4%) students in pre-workshop settings, to 27 (45%) students in post-workshops (Table 3). The number of students who correctly answered ≥ 51% remained constant (51.6%) from pre- to post-workshop test administrations. Four students missed the post-workshop knowledge test because of illness or program dropout. A comparison of participants' pre- and post-workshop tested knowledge of agricultural facts revealed no significant differences (Table 4), probably because their overall test average increased by only 0.05 points as a result of their participation in the workshops.

Summary

The Big City, Big Country Road Show was a series of inner-city, high school student recruitment workshops designed to introduce communications-related agricultural careers to youth through unique learning experiences. Research has shown that colleges must actively recruit students to agriculture majors (Scott and Lavergne, 2004), and that underrepresented groups (specifically, Hispanic and African American), tend to view agricultural careers only for those with agricultural backgrounds, or for those who work outdoors, or who had on-the-job training (White et al., 1991). Through communications technology and communication events, the BC2BC workshops presented high school students with new perspectives about agricultural careers beyond traditional production-related views.

Through a comparison of pre- and post-workshop tests, we found that hands-on experience significantly affected students' identification of careers they could attain with an agricultural science degree. Workshop students' perceptions of information technology careers, such as Web designers and photographers, were statistically significantly different (significant differences were also evident for loan officers, public relations officers, account representatives, government officials, and landscapers), from pre- to post-test administration, highlighting information technology as a critical factor for career consideration.

Previous studies (Conroy, 2000; Newsom-Stewart and Sutphin, 1997) suggested that students equated agriculture with science, but not with computers, engineering, and teaching. "Agriculture undermines the use of technology" was one of the reasons for not choosing agriculture by the students as a career, but the BC2BC workshops' inclusion of technology factors improved students' perceptions of these specific careers. The workshops contributed significantly to changing attitudes; similar programs should incorporate information and communication technologies into future initiatives.

The BC2BC workshops were not designed to increase the students' knowledge of general agricultural subjects; rather, they presented students with the idea of communications-related careers available to agriculture science majors. The lack of significant differences in pre- and post-test scores for the agricultural knowledge test highlighted this fact. While the general agricultural knowledge test results are interesting, their applicability to other programs is dubious. Future research should include a variety of agricultural knowledge assessment methods, procedures, and settings to better understand the role of increasing one's knowledge of agricultural facts and its possible effects on career decision making processes.

The BC2BC workshops helped students understand more about their perceptions of agricultural knowledge. Pretesting showed that students viewed themselves as more knowledgeable than their peers about agricultural subjects. However, student's perceived they knew less about agricultural subjects than did their peers after participating in the BC2BC workshops. As workshop participants were exposed to and learned about the connections between agricultural subjects and careers, their perspectives about agricultural careers were changed.

Roberts (2006), Esters (2007), and Esters and Bowen (2004) discovered that context is important when teaching youth. Structuring recruitment events where students observe and absorb their peers' experiences and where they participate directly in their own events can have significant positive impacts on their perceptions of agricultural careers. There exists the expectation that such experiences will lead to increased numbers of inner-city students from underrepresented groups choosing to enter into agricultural science majors and careers. To achieve this goal, colleges of agriculture faculty members and students will have to continue working together to meet, teach, and recruit inner-city youth in their schools. The BC2BC student recruitment model can serve as the template for successfully achieving this goal.

Literature Cited

Agriculture in the Classroom. n.d. Ag-knowledge. http://www.agclassroom.org/teacher/agknow.htm. U.S. Dept. of Agr. (March 29, 2011).

Catalano, R.F., M.L. Berglund, J.A.M. Ryan, S. Lonczak, and J.D. Hawkins. 2004. Positive youth development in the United States: Research findings on evaluations of positive youth development programs. Annals of the American Academy of Political and Social Science 591: 98-124.

Conroy, C.A. 2000. Reinventing career education and recruitment in agricultural education for the 21st century. Jour. of Agr. Education 41(4): 73-84.

Cronbach, L.J. 1951. Coefficient alpha and the internal structure of tests. Psychometrika 16: 297-334.

Dillman, D.A. 2007. Mail and internet surveys: The tailored design method. 2nd ed. Hoboken, NJ: John Wiley & Sons.

Duncan, D.W. and T.W. Broyles. 2004. An evaluation of student knowledge and perceptions toward agriculture before and after attending a Governor's School for Agriculture. Jour. of Southern Agr. Education Research 54(1): 280-292.

Esters, L.T. 2007. Relationship of career exploratory beliefs to career certainty of undergraduate agriculture students. NACTA Jour. 51(4): 31-37.

Esters, L.T. and B.E. Bowen. 2004. Factors influencing enrollment in an urban agricultural education program. Jour. of Career and Technical Education 21(1): 25-36.

Food and Agricultural Education Information System. 2007. Baccalaureate degree programs in agriculture, agriculture operations, and related sciences at all institutions. http://faeis.ahnrit.vt.edu/reports/reports2005_2006/enrollment/enroll_ag/enroll_ag_all_bacc.html. FAEIS Reports: Virginia Tech.

Gall, M.D., J.P. Gall, and W.R. Borg. 2007. Educational research: An introduction. 8th ed. Boston, MA: Pearson Education, Inc.

Ladner, D., G. Wingenbach, and M. Raven. 2002. Internet and paper-based data collection methods in agricultural education research. Jour. of Southern Agr. Education Research 52(1): 40-51.

Marcelin, G., L. Goldman, W.L. Spivey, J.D. Eichel, F. Kaufman, and A.R. Fleishchman. 2004. The junior fellows program: Motivating urban youth toward careers in health, science, and medicine. Jour. of Urban Health: Bul. of the New York Academy of Medicine 81(3): 516-523.

Mitchell, G.D. 1993. Factors related to minority student enrollment and retention in the College of Agriculture and School of Natural Resources at the Ohio State University. PhD Diss., Dept. of Agr. Education, The Ohio State Univ., 2120 Fyffe Road, Columbus, OH. 43210.

Mullinix, K., A. Garcia, A. Lewis–Lorentz, and J. Qazi. 2006. Latino views of agriculture, careers and education: Dispelling the myths. NACTA Jour. 50(2): 2-11.

Newsom-Stewart, M. and H.D. Sutphin. 1997. How tenth grade students perceive agriculture and environmental science: Comparison by gender and ethnicity. Jour. of Agr. Education 35(3): 50-56.

Outley, C. 2008. Perceptions of agriculture and natural resource careers among minority students in a national organization. In: Chavez, D., P. Winter, and J. Absher (eds.). Recreation visitor research: Studies of diversity. Albany, CA: Dept. of Agr., Forest Service; Pacific Southwest Research Station.

Passel, J.S. and V. Cohn. 2008. U.S. population projections: 2005-2050. Pew Research Center, Washington D.C.: Social & Demographic Trends and the Pew Hispanic Center.

Roberts, T. 2006. A philosophical examination of experiential learning theory for agricultural educators. Jour. of Agr. Education 47(1): 17-29.

Scott, F.L. and D. Lavergne. 2004. Perceptions of agricultural students regarding the image of agriculture and barriers to enrolling in agricultural education class. Jour. of Southern Agr. Education Research 54(1): 48-59.

Talbert, B.A. and A. Larke, Jr. 1995. Factors influencing minority and non-minority students to enroll in an introductory agriscience course in Texas. Jour. of Agr. Education 36(1): 38-45.

Tuckman, B.W. 1999. Conducting educational research. Belmont, CA: Wadsworth Group.

USDA. 2007. 2007 Annual Employee Survey Results. http://www.usda.gov/da/employ/2007AES.pdf. U.S. Dept. of Agr.

USDA-Grants-MSP FAQs. n.d. Higher Education Multicultural Scholars Program (MSP). http://www.nifa.usda.gov/funding/msp/msp_faqs.html. U.S. Dept. of Agr.

White, C., B.R. Stewart, and R.E. Lindhardt. 1991. Career opportunities in agriculture as perceived by inner-city high school students. Jour. of Agr. Education 34(4): 55-63.

Wildman, M. and R.M. Torres. 2001. Factors identified when selecting a major in agriculture. Jour. of Agr. Education 42(2): 46-55.

Wiley, Z.Z., B.E. Bowen, C.F. Bowen, and A.L. Heinsohn. 1997. Attitude formulation of ethnic minority students toward the food and agriculture sciences. Jour. of Agr. Education 38(2): 21-29.

Wingenbach, G., C. Akers, and C. Berry. 2007. Big City, Big Country Road Show: Recruiting non-traditional and underrepresented students into the food and agricultural sciences workforce (CRIS Rep. No. 0206979). Washington, D.C.: USDA-CSREES SERD Grant TEX08934.