RURAL AND URBAN INNER-CITY HIGH SCHOOL STUDENT KNOWLEDGE AND PERCEPTION OF AGRICULTURE

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Abstract

This study was conducted to assess the knowledge and perception of rural and urban inner-city students in two Midwestern states regarding agriculture, food, and natural resources. Since this study was a pilot project, these two subgroups of the United States population were assessed to provide baseline data reflecting the knowledge and perceptions of United States residents regarding agriculture and the food industry. Data were collected from 1121 respondents but did not constitute a representative sample of students in the two Midwestern states. However, the results of this study may have implications for other groups on a practical basis. Three objectives were specified for this study as follows: 1) to assess the level of agricultural knowledge among rural and urban inner-city high school students in a midwest; 2) to assess the level of agricultural perceptions among rural and urban inner-city high school students in the midwest; and, 3) to compare the level of agricultural knowledge and perception of both subgroups. Both groups of respondents were most knowledgeable about Natural Resources concepts whereas the Rural Students were least knowledgeable about the Plants in Agriculture concept area compared to the Urban Inner-City High School Student respondents who were least knowledgeable about the Policy concept area. Overall, respondents had the most positive perception about the Natural Resources concept area and were the least positive about the Agricultural Policy concept area.

Men and women of all ages and ethnic groups have a vested interest in agriculture (Law & Pepple, 1990). Consumers as well as policy makers need to be "agriculturally literate" in order to respond appropriately as issues arise. Most Americans, whether young or old, have limited knowledge about agriculture and food production. Many would agree with the need for a basic understanding of agriculture, the agricultural industry, and its importance to our country and citizens. Mawby (1990, p. 72) noted that by "...educating Americans in the wise management of food supplies and related renewable resources, we can anticipate more knowledgeable decision-making about agriculture in the future."

No research has been conducted to compare the agricultural literacy level of individuals from various ethnic groups. However, Horn and Vining's (1986) study found that fewer than thirty percent of a sample (n = 2000) of Kansas students, primarily of European descent, could give correct answers to basic agriculture questions. To date, no study has been published specifically regarding the agricultural literacy level of students of African American descent; however, Washington and

Rodney's (1984) study suggested that parents tended to steer students away from agricultural and natural resources careers. In addition, they noted that there seemed to be a lack of information about agriculture and natural resources at the secondary school level.

In another descriptive study, Leatherberry and Wellman (1988) reported black students knew little about the skills needed by a wide range of natural resource professionals, the jobs available, and the wages earned in those careers. According to Case (1994), urban black youth lack an agriculture and natural resources background to enable them to make an immediate commitment to a career. Based on these studies, there appears to be a need to assess and compare how these two groups differ in their knowledge and perception of agriculture.

Before measuring the agricultural literacy level of a particular segment of our society, the concept of literacy must be examined. In the past, literacy usually referred to some minimum level of reading and writing skills. Bornmuth (1975) suggested that the list of materials will always differ from person to person and situation to situation and therefore offered the definition of literacy as "the ability to respond competently to real-world reading tasks" (p 65). Sticht (1975) defined functional literacy as "the possession of those literacy skills needed to perform some reading task imposed by an external agent between the reader and a goal the reader wishes to obtain" (pp 4-5). Kirsh and Guthrie (1978) pointed out that reading the same material (i.e., a magazine) is functional for some people and leisure reading for others.

The ability to competently read required work-related materials was defined as occupational literacy by Rush, Moe, and Storlie (1986). More recently, the ability to read packages, traffic signs, and a bus schedule have been included in the modern definition of a basic concept of literacy. The level of skill (knowledge) needed to be literate is a relative measure without absolute standards. Functional agricultural literacy does not imply a perfect level of understanding about agriculture, but rather a minimum level.

The first step in improving the agricultural literacy level of any population is to determine the current literacy level. If educational initiatives designed to improve America's agricultural literacy are to succeed, a bench mark that verifies the level of agricultural knowledge and perception should be determined.

Purpose and Objectives

The purpose of this pilot study was to assess the agricultural literacy level of rural and urban inner-city high school students in the midwest. Since this study was a pilot project, these two subgroups of the United States population were assessed to provide baseline data reflecting the knowledge and perceptions of United States residents regarding agriculture and the food industry.

Three objectives were specified for this study as follows: a) to assess the level of agricultural knowledge among rural and urban inner-city school students in the midwest; b) to assess the level of agricultural perceptions among rural and urban inner-city high school students in the midwest; and, c) to compare the level of agricultural knowledge and perception of both subgroups.

Methods and Procedures

A data collection instrument organized in three sections was developed for this study. The instrument included a knowledge section, perception section, and demographic section. The instrument was developed using Frick's (1990) Delphi study as the basis. However, for this study, Frick's eleven agricultural literacy concept areas were collapsed into seven areas. The concept areas were: (a) Societal and Global Significance of Agriculture; (b) Public Policy in Agriculture; (c) Agriculture's Relationship with the Environment and Natural Resources; (d) Plant Science; (e) Animal Science; (f) Processing of Agricultural

Products; and, (g) Marketing and Distribution of Agricultural Products.

This instrument was used in a previous study which utilized college students as respondents. The reliability of the knowledge section of the instrument was assessed by calculating a Kuder-Richardson 20 (KR-20) coefficient over all knowledge statements. The KR-20 computed for the knowledge section of the instrument was .85. The perception section of the instrument was assessed by computing a Cronbach's alpha coefficient as a measure of instrument reliability. The Cronbach's alpha coefficient computed for the items included in the perception section was .90. A national panel of experts in agricultural literacy reviewed the instrument for content validity. In the judgement of the expert panel, the instrument was considered to be a valid tool for use in assessing agricultural literacy concepts.

The instructions in the knowledge section directed respondents to answer either "True," "False," or "Don't Know" to each of the 35 statements (five statements for each knowledge concept area). The second section of the data collection instrument (perception) consisted of 35 perception statements (five statements for each perception concept area) to which respondents were directed to use a Likert-type response scale ranging from Strongly Agree (1), to Neutral (3), to Strongly Disagree (5).

Demographic variables in section three included: gender, race, home location, population of nearest town, acreage of parents who farm, if relatives worked on a farm, if relatives worked in an agribusiness, agricultural courses taken, membership in FFA, involvement in raising animals or pets, involvement in raising gardens or crops, news sources read, and highest grade level completed.

The data were collected using optically scanned answer sheets which instructed respondents to indicate their responses using #2 lead pencils. Data analysis was completed using procedures available through the Statistical Analysis System (SAS) on the University of Missouri mainframe computer.

Results

Table 1 presents demographic characteristics of the two respondent groups. In total, there were 1,121 individuals who provided responses which were used for data analysis. The Rural High School Student group consisted of 668 respondents from predominantly rural Indiana areas (populations less than 25,000). The Urban Inner-City High School Student group consisted of 453 student respondents from a predominantly urban (population greater than 100,000) area of Michigan.

Knowledge and Perception of Agriculture

Analysis involved the computation of means and standard deviations for the Knowledge of Agriculture and Perception of Agriculture scores for all respondents and each group, respectively. Scores are reported for the overall knowledge and perception scale in addition to each of the seven concept areas comprising agricultural literacy. The mean Knowledge of Agriculture score was 22.77 for the Rural High School Student group compared to a mean of 16.95 for the Urban Inner-City High School Student group. When examined by respondent group, it was observed that the Rural High School Student group produced the highest group mean knowledge score for all seven of the concept areas. Table 2 presents the mean scores and standard deviations for the total knowledge score and the seven concept areas represented in the knowledge section of the instrument.

Table 1. Demographic Characteristics of Respondent Groups

	Group

Variable		Rural High School (n = 668)	Inner-City High School (n = 453)
Gender-	Female	50.5[a]	58.1
	Male	49.4	41.9
Ethnicity-	Asian	4.7	0.9
	Black	3.5	86.3
	Hispanic	1.2	2.7
	White	88.5	6.7
	Other	2.1	3.4
Home-	Farm	10.1	5.1
	Rural Area	41.1	0.5
	Town/City	48.8	94.4
Population-	<2,500	19.3	4.8
	2,501 - 10,000	30.1	5.9
	10,001 - 25,000	5.8	4.3
	25,001 - 100,000	41.2	3.9
	>100,000	3.6	81.1
Size of Farm -	No farm	84.0	89.6
	10-50 acres	6.6	4.8
	51-200 acres	2.6	3.4
	201-750 acres	2.9	1.4
	>750 acres	3.8	.1
Relatives on Farm-	Yes	48.5	37.2
	No	51.5	62.6
Relatives in Agribusiness-	Yes	36.3	28.2
	No	63.7	71.8
High School Agriculture-	Yes	18.1	16.8
	No	81.9	83.2
FFA Member-	Yes	9.6	5.6
	No	90.4	94.4

(table continues)

Table 1. (continues)

	Group

Variable		Rural High School (n = 668)	Inner-City High School (n = 453)
4-H Member-	Yes	26.7	16.8
	No	73.3	83.2
Raised Animals or Pets	Yes	79.9	7.8
	No	20.1	22.2
Raised Plants, Gardens,	Yes	63.3	57.5
or Crops	No	36.7	42.5
Read News Magazines	Yes	41.6	42.5
	No	58.4	57.5
Read Newspaper	Yes	72.0	68.4
	No	28.0	31.6
Listen to Radio-	Yes	86.7	90.5
	No	13.3	9.5
Watch Television-	Yes	88.1	81.3
	No	11.9	18.7
Highest Grade Completed:			
	< = 8th grade	1.8	1.9
	9 - 10th grade	1.4	2.6
	11 - 12th grade	94.8	95.1
	some college	1.1	0.5
	B.S. or more	0.9	0.0

[a] Data are percentages rounded to nearest decimal point

The overall mean Perception of Agriculture score was 83.90 for the Rural High School Student group to 85.79 for the Urban Inner-City High School Student group. Lower perception scores reflected more positive perceptions of agriculture. The Rural High School Student group produced lower perception mean scores for the Significance, Natural Resources, Plants in Agriculture, Processing, and Marketing concept areas. The Urban Inner-City High School Student group produced lower perception mean scores for the Animals in Agriculture concept area and virtually the same score as their rural counterpart in the Policy concept area. Table 3 presents the mean scores and standard deviations for the total perception score and the seven concept areas represented in the perception section of the instrument.

Table 2. Means and Standard Deviations of Agriculture Knowledge Scores by Respondent Group

	Group

Domain	Concept Area	Rural High School (n=668)	Inner-City High School (n=453)
Knowledge:			
	Significance[a]	3.62/1.07[b]	2.54/1.43
	Policy	2.84/1.24	2.14/1.64
	Natural Resources	3.96/1.01	2.91/1.39
	Plants	2.78/1.24	2.15/1.31
	Animals	3.27/1.24	2.70/1.31
	Processing	2.90/1.21	2.21/1.35
	Marketing	3.35/1.24	2.32/1.43
	Total[c]	22.77/ 5.38	2.32/6.46

[a] Scales range from 0 to 5; [b] Mean/Standard Deviation; [c] Scale range from 0 to 35.

Table 3. Means and Standard Deviations of Agriculture Perception Scores by Respondent Group

		Group	
Domain	Concept Area	Rural High School (n=668)	Inner-City High School (n=453)
Perceptions:			
	Significance[a]	11.87/2.68[b]	12.48/3.12
	Policy	13.42/2.67	13.40/3.03
	Natural Resources	11.06/2.10	11.70/2.36
	Plants	11.22/2.22	11.89/2.39
	Animals	11.85/2.85	11.58/2.99
	Processing	12.34/3.03	12.87/3.54
	Marketing	12.13/2.58	12.37/3.40
	Total[c]	83.90/12.21	85.79/15.42

[a]Scale ranged from 5 to 25; [b] Mean/Standard Deviation; [c] Scales ranged from 35 to 175.

A General Linear Model (GLM) procedure was conducted on the overall knowledge and perception score as well as the seven concept areas of knowledge and perception. The GLM procedure was used for this analysis because of the unequal size of the groups being compared. Table 4 indicates that there was a significant difference in the overall knowledge score and all seven of the concept area scores with Rural High School students obtaining higher mean scores as a group. In addition, Table 4 shows that the overall perception score was not significantly different between the two groups and that only two of the seven perception concept areas, Animals and Plants, were significantly different with Rural High School Students receiving higher mean scores in those two concept areas.

Table 4. General Linear Model of Knowledge and Perception of Agriculture by Concept Area Group for Rural and Inner-City Students

Domain	Concept Area	df	F	p
Knowledge:				
	Significance		82.15	0.0001
	Policy		50.97	0.0001
	Natural resources		103.85	0.0001
	Plants		36.02	0.0001
	Animals		38.08	0.0001
	Processing		59.24	0.0001
	Marketing		35.35	0.0001
	Total	1,119	148.52	0.0001
Perceptions:				
	Plants		8.60	0.0035
	Animals		10.34	0.0013
	Total	1,119	1.41	0.2354

Conclusions

1. Rural High School Student respondents were most knowledgeable about Natural Resources concepts and were least knowledgeable about the Plants in Agriculture concepts. Overall, 65 percent of the items in the Knowledge section were answered correctly by the Rural High School Student respondents.

2. The Urban Inner-City High School Student respondents were most knowledgeable about Natural Resources concepts and were least knowledgeable about the Policy concepts with the Plants in Agriculture concepts having a slightly higher mean score than that of the Policy concepts area. Overall, 47.9 percent of the items in the Knowledge section were answered correctly by the Urban Inner-City High School Student respondents.

3. Overall, respondents had the most positive perception about the Natural Resources concept area and were the least positive about the Agricultural Policy concept area.

4. Overall, both respondent groups had relatively positive perceptions of agriculture.

5. Rural High School Students respondents had significantly higher knowledge concept scores than Urban Inner-City High School respondents in all of the seven areas. However, Rural High School Student respondent perception concept scores were found to be significantly higher in only the animal and plant areas.

Recommendations

Agricultural literacy is a concept founded on the premise that citizens of the United States should possess a basic understanding of the industry of agriculture. This study provides evidence of the need to further educate the general public regarding the industry which produces and markets the food needed to sustain human life. It should be recognized that the data collected from respondents cannot be generalized to any population on a statistical basis. However, the findings may have practical implications for food and agriculture policy makers and should direct researchers to further examine the issue of agricultural literacy in

this country.

Relatively low knowledge concept mean scores were produced in the areas of Plants in Agriculture, and Agricultural Policy for both groups. These areas appear to be target areas for future educational efforts to enhance the knowledge and understanding of United States citizens. However, there is sufficient room for improvement in the knowledge levels of each of the seven concept areas included in this study.

Respondents from smaller cities and towns were found to be more knowledgeable than their counterparts from larger population centers. Persons from smaller communities and rural areas would be more likely to interact with farmers and other individuals working in agricultural businesses. Conversely, persons who reside in larger cities and metropolitan areas would expectedly have fewer opportunities to interact with farmers and individuals employed in agricultural businesses. Therefore, educational programs should be provided in larger population centers to meet the educational needs of those residents regarding agriculture, food, and natural resources.

Teachers in elementary and secondary schools should be encouraged to develop a greater understanding of the importance and significance of agriculture in this country and the world. Instructional assistance should be provided through pre-service and inservice programs which would facilitate the use of agricultural examples in elementary and secondary school classes. Graduates of our secondary school systems should not be considered to have received a "well-rounded education" if they lack an understanding and appreciation of the significance of agriculture in their daily lives.

Although group differences were identified for the Perception of Agriculture variable, each group produced positive perception scores. Therefore, it was concluded that although the respondent groups in this study had a limited knowledge of agriculture, their perception of the industry was somewhat positive. It might also be concluded that more positive perceptions might result if the agricultural literacy knowledge level of United States citizens were to be enhanced. Recognizing the relationship between agricultural knowledge and perceptions, it is hypothesized that programs directed toward the 30 plus percent of the knowledge responses which were "incorrect" or "don't know" would result in an even more positive perception of agriculture. Therefore, it is recommended that educational programs be first directed to address the agricultural knowledge that the targeted audience does not know rather than verifying the agricultural knowledge they do know.

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