

Relationships of Elementary Teachers' Perceptions and Activities Conducted Regarding the Integration of Agricultural Awareness Activities into the Curriculum

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Abstract

The purpose of this descriptive correlational study was to describe the relationships of selected demographic variables, activities conducted, and perceptions held by elementary teachers (K through 6) in a selected seven county area in east central Iowa. The three objectives of this study were: (1) To identify relationships among selected demographic variables of elementary school teachers' perceptions related to the integration of agriculture in elementary curricula, agricultural awareness, and the agricultural industry; (2) to identify relationships among selected variables as to the extent of agricultural awareness activities were conducted by elementary teachers; and, (3) to identify relationship among the perceptions domains and the agricultural awareness activities conducted (behavior) domain.

This study was conducted using a mailed questionnaire that measured teachers' perceptions. Agriculturally related activities were identified to indicate the extent to which these activities were conducted in elementary classrooms. Demographic information was also collected. Post hoc reliability alphas were 0.88 for the items related to Integration of Agriculture, 0.86 for the items related to Agricultural Literacy and Awareness, and 0.85 for the items related to the Agricultural Industry. The usable response rate of the sample was 41 percent (281 out of 689). Elementary teachers had positive perceptions regarding integrating agriculture into the elementary curriculum, the need for agricultural awareness in their education, and the need for the agricultural industry. Two hundred twenty-eight teachers (81%) indicated that they had conducted agricultural activities in their instruction at least once during the school year.

For the correlations, nine demographic variables were selected for the study: (1) gender; (2) degree of education; (3) grade levels taught; (4) years of teaching experience; (5) agricultural classes, workshops, or in-service programs taken; (6) agricultural experience; (7) agriculture teacher in the school district; (8) type of community; and, (9) school district enrollment. The coefficients among the matrix of relationships ranged from being negligible (.006) to low (.211) for the nine demographic variables, the three perception domains, and the behavior domain. Therefore, it was concluded that demographic variables of elementary teachers do not matter related to their perceptions and behaviors of integrating agriculture in the curriculum. Moreover, the relationships of the 3 perception domains and the behavior domain ranged from low (.171) to moderate (.584). Elementary teachers with positive perceptions of integrating agriculture in their curriculum were more likely to conduct agricultural activities in their classroom. The results of this study supported Fishbein and Azjen's (1975) attitude theory that positive beliefs and attitudes lead to specific intentions and behaviors.

Introduction and Theoretical Framework

Agricultural educators have discussed the need for instruction about agriculture in elementary grades for many years (Fox, 1932; Herr, 1968; Keenan, 1970; Peterson & Bardson, 1973; Shepard, 1970; Shively, 1936; Snowden & Shoemake, 1973; Swan & Donaldson, 1970; Wolfson, 1970;). In 1988, the National Research Council recommended that “beginning in kindergarten and continuing through twelfth grade, all students should receive some systematic instruction about agriculture” (p. 2). The National Research Council (1988, p. vi) defined agricultural literacy as “an understanding of basic concepts and knowledge spanning and uniting all of these subjects” that broadly encompass agriculture. Moreover, Frick, Kahler, and Miller (1991) defined agricultural literacy as “processing knowledge and understanding of our food and fiber system. An individual possessing such knowledge would be able to synthesize, analyze, and communicate basic information about agriculture” (p. 52). Although agricultural literacy and agricultural awareness are closely related, the term agricultural awareness was used for this study and was conceptualized as “experiencing or exploring agriculture as it relates to the subject matter being studied or context of life being lived; the ability to identify the connections of agriculture to areas of study or life” (Knobloch, 1997, p. 12).

In reviewing the related literature, agricultural educators have found that teachers and students vary in their perceptions and knowledge of agriculture. Elementary teachers had little knowledge of agriculture (Terry, Herring, & Larke, 1992; Swan & Donaldson, 1970). Students lacked basic knowledge of agriculture according to Horn and Vining (1986, cited in Herren & Oakley, 1995). On the other hand, Humphrey, Stewart, and Linhardt (1994) found that preservice elementary teachers’ knowledge of agriculture was high and their perceptions towards agriculture were generally positive. Moreover, Harris and Birkenholz (1996) concluded that secondary educator groups were knowledgeable of and had positive attitudes toward the industry of agriculture.

A teacher’s background and experience plays a significant role in educating students about agriculture. Researchers have found that teachers with agricultural experience had more agricultural knowledge and more accurate perceptions of agriculture (Humphrey, Stewart, & Linhardt, 1994; Terry, Herring, & Larke, 1992). Further, preservice elementary teachers with agricultural experience have been found to be more confident in teaching agriculture (Humphrey, Stewart, & Lindhardt, 1994). Rudd and Hillison (1995) concluded that teachers’ knowledge, attitude, and expectations of a new curriculum were positively correlated predictors of the amount of new curriculum taught.

Agricultural educators have advocated that agriculture should be integrated into elementary classes (Birkenholz, Frick, Gardner, & Machtmes, 1994; Leising & Zilbert, 1994; Terry, Herring, & Larke, 1992; Frick, Birkenholz, & Machtmes, 1995). Trexler and Suvedi (1998) found that elementary teachers in Michigan were sometimes comfortable using the problem solving method, connecting science teaching to community problems, and using agriculture as a context for science. Furthermore, elementary teachers moderately supported the concept that science can be taught through agricultural examples (Trexler & Suvedi, 1998). In addition, Balschweid, Thompson, and Cole (1998) found that K-12 teachers perceived their students most interested in animals, crops, and food processing. Elementary teachers in Texas taught agricultural knowledge and concepts approximately 8 hours a year (Terry, Herring, &

Larke, 1992).

Intervention programs with elementary teachers have shown positive results. Balschweid, Thompson, and Cole (1998) found that 90 percent of the elementary and secondary teachers who participated in an agricultural literacy in-service program integrated agriculture into at least one of their lessons. Trexler and Suvedi (1998) found that teacher perceptions of agriculture and confidence toward integrating agriculture into science improved after a curriculum intervention program on science and agriculture. Herren and Oakley (1995) concluded that elementary teachers taught how to integrate Agriculture in the Classroom resources, reported higher student achievement of agricultural concepts. In addition, the program has been effective for students in rural and urban settings (Herren & Oakley, 1995).

Mawby (1985) suggested “few issues are of greater importance to the world than adequate food supplies, proper food use, and knowledge about the components of the agricultural industry” (p. 7). Spokespersons outside of agricultural education have recommended that agricultural knowledge be taught in the elementary school grades (De Christopher, 1993; Lucht, 1993). The literature provides ample evidence that agricultural awareness is a worthy area of inquiry.

The philosophical base underpinning the need for agricultural awareness in elementary classrooms was based on Dewey’s (1938) philosophy of education. Dewey stated that “anything which can be called a study, whether arithmetic, history, geography, or one of the natural sciences, must be derived from materials which at the outset fall within the scope of ordinary life experience” (p. 73). Further, Dewey expounded,

It is a sound educational principle that students should be introduced to scientific subject matter and be initiated into its facts and laws through acquaintance with everyday social applications. Adherence to this method is not only the most direct avenue to understanding science itself as the pupils grow more mature it is also the surest road to the understanding of the economic and industrial problems in present society. For they are the products of a large extent to [sic] the application of science in production and distribution of commodities and services, while the latter processes are the most important factor in determining the present relations of human beings and social groups to one another (p. 80).

Therefore, integrating agricultural awareness activities into elementary education would provide learning opportunities based on experiences related to production and distribution of commodities and services—agriculture. Significantly, agriculture has employed more people than any other industry in the nation (American Farm Bureau Federation, 1998). Dewey (1938) expostulated that schools should teach students to learn knowledge and thinking skills by solving problems in real life experiences. Since agricultural education teaches students how to solve problems, the integration of agriculture in elementary education could be based upon sound pedagogical principles.

The role of the teacher has been shown to be very important for integrating agriculture in the elementary curriculum (Terry, Herring, & Larke, 1992). Therefore, if teachers are change

agents for integrating agriculture into the elementary curriculum, then their perceptions about the integration of agriculture, need for agricultural awareness, and agricultural industry would affect the integration of agriculture into the elementary curriculum. This study was based on the premise that “values, attitudes, needs, and wishes, as well as impulses and motives, are projected upon objects and behaviors outside of the individual” (Kerlinger, 1973, p. 514). Therefore, people perceive the world through their own set of values, beliefs, attitudes, and intentions. Although some researchers (Humphrey, Stewart, & Lindhardt, 1994; Terry, Herring, & Larke, 1992) studied pre-service and in-service elementary teachers’ knowledge and perceptions of agriculture, the agricultural education profession has not sufficiently addressed the perceptions of and activities conducted by elementary teachers toward the integration of agriculture into the curriculum.

Purpose and Objectives

The purpose of this study was to describe the relationships of selected demographic variables, activities conducted, and perceptions held by elementary teachers (K through 6) in a selected seven county area in east central Iowa. The three objectives of this study were: (1) To identify relationships among selected demographic variables of elementary school teachers’ perceptions related to the integration of agriculture in elementary curricula, agricultural awareness, and the agricultural industry; (2) to identify relationships among selected variables as to the extent of agricultural awareness activities were conducted by elementary teachers; and, (3) to identify relationships among the perceptions domains and the agricultural awareness activities conducted (behavior) domain.

Methods and Procedures

The target population of this study was elementary teachers in a seven county educational service area in east central Iowa. There were 52 school districts in the target population. The districts ranged in size from very small with six students to the second largest school district in Iowa with over 17,000 students. The mean size of the school districts in the sample was 5,725 students per district. The Grant Wood Area Education Agency mailing list of teachers served as the frame. There were 2,067 teachers in the frame who taught in 33 public school districts and 19 private school districts. An equal-probability-of-selection method sample of 689 teachers was selected using a systematic sampling method (Babbie, 1990). Forty-five percent of the teachers (311/689) returned the questionnaire. Since some questionnaires were returned blank or partially completed, the data sample consisted of 281 questionnaires (41% response rate).

The instrument used to collect the data of this study was a mailed questionnaire containing 90 items in four parts. The researchers created the instrument. Part A contained 31 items related to beliefs about integrating agriculture into elementary classes representing three conceptual domains: (1) Integration of Agriculture; (2) Agricultural Awareness; and, (3) The Agricultural Industry. Perceptions were measured using a 5 point summated rating scale. Teachers were asked to respond to each statement using the following rating scale: Strongly Disagree (SD = 1), Disagree (D = 2), Neutral (N = 3), Agree (A = 4), and Strongly Agree (SA = 5). Part B contained 48 items regarding agricultural activities in the classroom. The activities

related to general agriculture and the seven career areas of agriculture—agricultural mechanics, agricultural processing, agricultural production, agricultural sales and services, forestry, horticulture, and natural resources and conservation (Newcomb, McCracken, & Warmbrod, 1993). The teachers were asked to respond to the number of times which they had conducted the activities in their instruction during the past year. Their choices were: Never = 0, Once a year = 1, Twice a year/once a semester = 2, and Three or more times a year = 3. Part C contained one open-ended question used to ascertain other comments regarding the teachers' thoughts and ideas about teaching agriculture in the elementary classes. Part D contained ten items related to demographic information.

Content and face validity was established from a panel of elementary teachers, a school superintendent, a professional accountant, and faculty members of the Department of Agricultural Education and Studies at Iowa State University. Items related to the agricultural activities were teaching ideas developed by elementary teachers in the Teachers' Academy on Agricultural Awareness workshops. The estimates of reliability, using Cronbach's alpha, were 0.88 for the items related to Integration of Agriculture, 0.86 for the items related to Agricultural Literacy and Awareness, and 0.85 for the items related to the Agricultural Industry (Nunnally, 1967).

Questionnaires were sent to the elementary teachers at their school addresses. A follow-up postcard was sent as a reminder 10 days after the initial mailing. One plausible reason for the lower response rate was because there was not enough time to send subsequent follow-up reminders due to the end of the school year. Non-response error was controlled by the "double-dip" method (Miller & Smith, 1983). Five percent of the non-respondents were randomly sampled. Their responses were compared to respondents using summated means. T-tests indicated no significant differences between the non-respondents' and respondents' responses on ten randomly selected items.

Descriptive inferential statistics were used to analyze the data sample. The data set was analyzed using SPSS. Negatively worded items were reverse coded in the summations of the conceptual domains. Means were calculated for composite scores. Means and standard deviations of the conceptual domains were calculated from the means of the items to assess the overall attitude of elementary teachers toward the integration of agriculture, agricultural awareness, and the agricultural industry. Summated means were calculated for the domain of agricultural awareness activities conducted. Relationships involving categorical variables and dependent variables were described using point bi-serial and eta coefficients; means and standard deviations were reported with each coefficient. Means were compared using t-tests, with alpha set at .05 a priori, to interpret the relationships for the categorical variables and the dependent variables. Relationships involving numerical variables were described using the Pearson product-moment coefficient.

Results and Findings

Ninety percent ($n = 274$) of the teachers were female and 10 percent were male ($n = 27$). Sixty-two percent ($n = 171$) of the teachers had a bachelor's degree and thirty-eight percent ($n = 103$) of the teachers had a master's degree. The grade levels taught by the elementary teachers were divided into kindergarten through second grade (50%); third to fourth grade (34%); and

fifth to sixth grade (34%). The years of teaching experience of the teachers in the sample were evenly distributed among the categories of teaching experience. Thirty-nine elementary teachers (14%) had taken agricultural classes, workshops, or in-service programs. One hundred fifty-six elementary teachers (56%) had agricultural experience. One hundred twenty-one elementary teachers (43%) had an agriculture teacher in their school district. Half of the teachers (n = 136) in the sample taught in rural community; one-fourth (n = 67) taught in a metropolitan community; and one-fourth (n = 67) taught in an urban community. Many teachers taught more than one grade level and more than one subject. The elementary teachers taught a wide array of subjects (Knobloch & Martin, 1998).

Elementary teachers had positive perceptions regarding integrating agriculture into the elementary curriculum, the need for agricultural awareness in their education, and the need for the agricultural industry (Table 1). The Integration of Agriculture domain represented items related to the integration of agriculture into the elementary curriculum, e.g., agriculture would enhance the curriculum; there is no time to teach agriculture in the elementary curricula; agriculture can be taught in any subject matter area; and, elementary school teachers are not trained to teach agriculture. The mean of this domain was 3.75 (SD = 0.44). The Agricultural Awareness domain represented items related to the need for students to learn about agriculture, e.g., basic knowledge of agriculture is important to make daily decisions; every elementary student should be taught agriculture no matter what career they want to pursue; every junior high/middle school student should be taught agriculture no matter what career they want to pursue; and, every high school student should be taught agriculture no matter what career they want to pursue. The mean of this domain was 3.50 (SD = 0.64). The Agricultural Industry domain represented items that related to the teachers' perceptions of the agricultural industry, e.g., agriculture includes horticulture and floriculture; there is no future in agriculture; agriculture is America's largest employer; and, agriculture is an environmentally conscious industry. The mean of this domain was 3.97 (SD = 0.39).

In regards to agricultural activities conducted, elementary teachers were asked the extent to which they conducted agricultural awareness activities in their curriculum. Over half of the 48 activities listed in the questionnaire were conducted by a majority of the teachers at least once during the school year. Some examples of the activities were recycled paper and discussed renewable resources; discussed an agricultural issue about the environment; viewed birds or wildlife; identified types of trees in a forest; and, identified the ingredients from a food label.

Table 1. Perceptions of elementary teachers regarding integration of agriculture, need for agricultural awareness, and need for the agricultural industry (n = 281)

<i>Domain</i>	<i>No. of Items</i>	<i>Mean</i>	<i>Standard Deviation</i>
Integration of Agriculture	14	3.75	0.44
Agricultural Awareness	4	3.50	0.64
Agricultural Industry	13	3.97	0.39

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly agree
 Two hundred twenty-eight teachers (81%) indicated that they had conducted agricultural activities in their instruction at least once during the school year. The mean was 0.80 (SD= 0.46, n=272).

For the correlations, nine demographic variables were selected for the study: (1) gender; (2) degree of education; (3) grade levels taught; (4) years of teaching experience; (5) agricultural classes, workshops, or in-service programs taken; (6) agricultural experience; (7) agriculture teacher in the school district; (8) type of community; and, (9) school district enrollment. The coefficients among the matrix of relationships (Davis, 1971) ranged from being negligible (.006) to low (.211) of the nine demographic variables, the three perception domains, and the behavior domain (Table 2). In Table 3, the coefficients for the relationships of the 3 perception domains and the behavior domain ranged from low (.171) to moderate (.584).

Although coefficients were identified with asterisks as being significant ($\alpha = .05$), relationships that were practically significant were discussed. Practical significance was determined to be moderate relationships with a coefficient of .30 or higher (Davis, 1971), or when about 10 percent of the variance can be explained. Therefore, there were no or low relationships among the demographic variables and the perception domains of the integration of agriculture, agricultural awareness, and the agricultural industry. Further, there were no and low relationships among the demographic variables and the agricultural activities conducted domain. However, there was one substantial relationship and there were three moderate relationships among the perception and behavior domains.

First, there was a substantial positive relationship ($r = .584$) between the Integration of Agriculture and Agricultural Awareness domain. With 95 percent confidence it is estimated that in the population of elementary teachers in the Grant Wood Area Education Agency the relationship between their perception of integrating agriculture and their perception of the need for agricultural awareness was positive with a magnitude within the range .50 - .86. Second, there was a moderate positive relationship ($r = .482$) between the Agricultural Awareness and Agricultural Industry domains. With 95 percent confidence it is estimated that in the target population of elementary teachers the relationship between their perception of the need for agricultural awareness and their perception of the agricultural industry is positive with a magnitude within the range of .39 - .58. Third, there was a moderate positive relationship ($r = .477$) between the Integration of Agriculture and Agricultural Industry domains. With 95 percent confidence it is estimated that in the target population of elementary teachers, the relationship between their perception of integrating agriculture and their perception of the agricultural industry is positive with a magnitude within the range .38 - .57. Fourth, there was a moderate positive relationship ($r = .370$) between the Integration of Agriculture and Activities Conducted domains. With 95 percent confidence it is estimated that in the target population of elementary teachers, the relationship between their perception of integrating agriculture and the extent of agricultural activities conducted in their instruction is positive with a magnitude within the range .26 - .47.

Table 2. Relationships of Selected Demographic Variables of Elementary Teachers and the Perception and Behavior Domains

<i>Independent Variables</i>	<i>Dependent Variables</i> (Domains)			
	<i>Perceptions</i>			<i>Behavior</i>
	<i>Integration of Agriculture</i>	<i>Agricultural Awareness</i>	<i>Agricultural Industry</i>	<i>Activities Conducted</i>
Gender	.004	-.055	-.035	.078
Male	3.74 (.47)	3.61 (.70)	4.01 (.47)	.69 (.48)
Female	3.75 (.44)	3.49 (.63)	3.97 (.38)	.81 (.45)
	n=277	n=281	n=281	n=272
Degree of education	.042	-.078	-.092	.138*
B.A./B.S.	3.73 (.39)	3.54 (.63)	3.92 (.45)	.76 (.48)
M.A./M.S.	3.77 (.44)	3.43 (.65)	3.97 (.39)	.89 (.41)
	n=270	n=274	n=274	n=265
Grades taught	.154	.006	.075	.201*
K-2	3.83 (.44)	3.52 (.68)	3.97 (.38)	.94 (.44)
3-4	3.73 (.41)	3.51 (.66)	4.04 (.37)	.79 (.39)
5-6	3.68 (.42)	3.51 (.56)	3.97 (.42)	.74 (.49)
	n=240	n=244	n=244	n=237
Experience (years)	.089	.092	.049	.101
0-7	3.80 (.41)	3.45 (.78)	4.00 (.38)	.78 (.51)
8-14	3.76 (.39)	3.60 (.61)	3.95 (.35)	.91 (.45)
15-21	3.79 (.41)	3.55 (.60)	3.98 (.37)	.84 (.42)
22 or more	3.71 (.47)	3.46 (.61)	4.00 (.44)	.82 (.43)
	n=241	n=245	n=245	n=238
Agricultural classes	.144*	.073	.013	.211*
Yes	3.72 (.43)	3.49 (.62)	3.97 (.37)	.76 (.43)
No	3.90 (.44)	3.62 (.77)	3.98 (.53)	1.04 (.53)
	n=276	n=280	n=280	n=271
Agricultural experience	.187*	.165	.087	.189*
Yes	3.65 (.42)	3.39 (.66)	3.93 (.42)	.71 (.43)
No	3.82 (.44)	3.60 (.61)	4.00 (.37)	.88 (.46)
	n=277	n=281	n=281	n=272
Agriculture teacher	-.010	.085	.112	-.024
Yes	3.75 (.42)	3.46 (.60)	3.93 (.38)	.81 (.43)
No	3.74 (.47)	3.57 (.68)	4.02 (.40)	.79 (.49)
	n=277	n=281	n=281	n=272

Table 2. Continued

Type of community	.150	.168*	.147	.021
Rural	3.82 (.44)	3.61 (.66)	4.02 (.38)	.85 (.48)
Metropolitan	3.75 (.39)	3.47 (.62)	4.00 (.42)	.83 (.42)
Urban	3.66 (.41)	3.35 (.59)	3.88 (.37)	.85 (.43)
	n=235	n=239	n=239	n=232
School district enrollment	-.094	-.130*	-.125*	.018
	n=271	n=275	n=275	n=266

Note. * The coefficient is significant at $\alpha = .05$.

Table 3. Relationships of Perception and Behavior Domains

	Numerical Variables			
	Perception Domains			Behavior
	Integration of Agriculture	Agricultural Awareness	Agricultural Industry	Activities Conducted
Integration of Agriculture	1.000	.584* n=277	.477* n=277	.370* n=269
Agricultural Awareness	---	1.000	.482* n=281	.293* n=272
Agricultural Industry	---	---	1.000	.171* n=272
Activities Conducted	---	---	---	1.000

Note. * The coefficient is significant at $\alpha = .05$.

Conclusions, Recommendations, and Implications

The conclusion that elementary teachers with positive perceptions of integrating agriculture in their curriculum were more likely to conduct agricultural activities in their classrooms supported research conducted by Rudd and Hillison (1995), who found that teachers' attitudes related to the amount of new curriculum that was taught. In pursuing another avenue of theory, this conclusion was congruent with Fishbein and Ajzen's (1975) theory, which supports the implication that elementary teachers with positive beliefs about the consequences of integrating agriculture and positive normative beliefs about agricultural awareness and the agricultural industry leads to positive attitudes and subjective norms, thus, leading to intentions and behaviors of integrating agriculture into their instruction. Furthermore, elementary teachers with positive perceptions of integrating agriculture were more likely to perceive the need for agricultural awareness and the agricultural industry positively. Therefore, elementary teachers who perceived the need for agricultural awareness were more likely to perceive the agricultural industry positively. Furthermore, teachers who perceived the agricultural industry positively were more favorable towards the integration of agriculture into the curriculum. These conclusions also supported Fishbein and Ajzen's (1975) theory. Further, the elementary

teachers' positive perception of the integration of agriculture in their curriculum tenably explains why many teachers conducted agricultural activities in their instruction.

Elementary teachers in this study had positive perceptions of agriculture being integrated into elementary classes. This finding supported the recommendation that agriculture should be integrated in the elementary curriculum (Birkenholz, Frick, Gardner, & Machtmes, 1994; DeChristopher, 1993; Dewey, 1938; Frick, Birkenholz, & Machtmes, 1995; Leising & Zilbert, 1994; Lucht, 1993; National Research Council, 1988; Terry, Herring, & Larke, 1992). However, the finding of low and no relationships among agricultural classes, workshops, or in-service programs taken and the perception and behavior domains was not congruent with the findings of Balschweid, Thompson, and Cole (1998) and Trexler and Suvedi (1998), who found that teachers conducted more agricultural activities in their instruction after in-service intervention programs. Furthermore, the finding of low and no relationship among agricultural experience and the perception and behavior domains was not supported by the findings of Terry, Herring, and Larke (1992) and Humphrey, Stewart, and Linhardt (1994), who found that teachers with agricultural experience had more accurate perceptions of agriculture.

The findings and conclusions of this study should be considered in the development of intervention programs for pre-service and in-service teachers by teacher education programs, agriculture teachers, and state department of education consultants. For example, demographic variables of elementary teachers do not matter related to their perceptions and behaviors of integrating agriculture into the curriculum, but what does matter are their perceptions of integrating agriculture into the curriculum, the need for agricultural awareness, and the agricultural industry, related to the extent they conducted agricultural activities in their instruction. Moreover, commodity organizations, agricultural promotion groups, and elementary education programs such as Agriculture in the Classroom and Food, Land, and People should consider the conclusions of this study in developing resources and programs that elementary teachers need and use in integrating agriculture into their curriculum. For example, these organizations and groups should collaborate with agricultural educators, such as professors and state specialists, who are experts in agricultural awareness and literacy in developing resources and curriculum materials. Agricultural educators at the local level should develop relationships and collaborate with elementary teachers to integrate agriculture into their instruction such as team-teaching mini-units, collaborating on special projects, or coordinating local community programs.

This study should be replicated in other states to determine if the findings vary because of geographical differences. Further, this study should be replicated in the future to determine if the economic and societal influences change normative beliefs of elementary teachers. This study should also be conducted to measure the changes in attitudes and behaviors after an intervention program related to agricultural awareness or agricultural literacy has been implemented. Further, data should be collected to assess why elementary teachers believe that agriculture should or should not be integrated into their instruction. Research should be continued in the development of an instrument that would predict elementary teachers' behaviors towards integrating agriculture into their instruction based on their perceptions. Future research studies should be conducted to identify barriers to integrating agriculture into the elementary curriculum and to describe student achievement associated with the integration of agriculture in the elementary curriculum.

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Relationships of Elementary Teachers' Perceptions and Activities Conducted Regarding the Integration of Agricultural Awareness Activities into the Curriculum

A Critique

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This paper adds to the growing inventory of studies regarding the integration of agricultural content into the elementary curriculum. Using a mailed questionnaire to gather data that measured teachers' perceptions, the researchers found that elementary teachers in east central Iowa had positive perceptions regarding integrating agriculture into their curricula, their need for agricultural awareness, and the need for the agricultural industry.

This study provides a solid conceptual framework for the research conducted. The literature review was rather comprehensive, ranging from those conducted by agricultural educators in recent decades on the need for instruction about agriculture in elementary grades to John Dewey's philosophic exhortations to teach scientific knowledge with everyday social applications and problem solving through real-life experiences. Appropriate research methods and procedures were used. The population was clearly defined and an adequate sample was selected and surveyed. Non-response error was carefully controlled. The latter was especially important, given a relatively low usable response rate of 41%. The data were analyzed in an appropriate manner.

Although the purpose of the study was clearly stated, the objectives could have been stated with greater precision. The three objectives for the study require some creative thinking and editing by the reader before their intended meanings can be fully ascertained. The researchers recognized and acknowledged their low usable response rate, reasoning that their survey was conducted near the end of the school year and allowed little time for follow-up reminders. A mailed questionnaire containing 90 items to respond to seems to have been a rather weighty assignment for teachers at this time of year. Consequently, size of questionnaire might also have impacted the response rate.

In findings consistent with those of previous studies, the researchers found that elementary teachers with positive perceptions of integrating agriculture in their curriculum were more likely to conduct agricultural learning activities in their classrooms. However, perhaps surprisingly, it was concluded that demographic variables of elementary teachers do not matter when related to their perceptions and behaviors of integrating agriculture in the curriculum. What does seem to matter are those teachers' perceptions of integrating agriculture into the curriculum, the need for agricultural awareness, and the agricultural industry, related to the extent they conducted agricultural activities in their instruction. These findings both challenge those of several previous studies and support findings from others in this important area of agricultural education. The researchers are to be complimented for identifying some of the variables that need to be considered in developing intervention programs for elementary teachers. They also have made some excellent recommendations for further studies.