

Perceptions of Career and Technical Education Supervisors Toward Core Subject Area Integration in an Agricultural Education Program

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Abstract

The purpose of this study was to examine the perceptions of Florida CTE supervisors concerning core subject area integration in the agricultural education program. The target population for this study was all CTE supervisors in Florida. This study employed a descriptive survey research design. Results indicated that CTE supervisors had positive perceptions of teachers' ability to integrate core subject areas in an agricultural education program. Furthermore, CTE supervisors indicated that only some agricultural education programs incorporate science, mathematics, and reading into the curriculum. Respondents also indicated a need for preservice teachers to have more instruction in core subject area integration. Based on these findings, teachers should continue to integrate core subject areas into the agricultural education program; given opportunities for professional development in effective integration of core subject area concepts. Additionally, teacher preparation programs in Florida should evaluate coursework and observational experiences to effectively prepare preservice agriculture teachers.

Introduction/Literature Review

In 1998, the Carl D. Perkins Act stated that the act was to “promot[e] the development of services and activities that integrate academic, vocational, and technical instruction...” (Section 2 (b)(2)). Since then, there has been an increasing interest from policymakers and school administration to use an integrated curriculum approach in Career and Technical Education (CTE) courses at the secondary level (Johnson et al., 2003). Williams (2017) outlined that curriculum should be connected to real-life applications of knowledge and skills, to help students link their education to the future. As a result of this projection in connecting real-life applications, CTE programs are expected to enhance student learning of academic goals in reading, writing, and mathematics (Stone, 2017).

The push for academic integration in agricultural education programs has been attributed to external pressure from the administration, as noted by many agricultural educators (Washburn & Myers, 2010). Due to this push for academic integration, many researchers have investigated the perceptions of agriculture teachers concerning core academic integration in agricultural education (Balschweid & Thompson, 2002; Haynes et al., 2014; Layfield et al., 2001; McKim et al., 2016; Myers & Thompson, 2009; Myers & Washburn, 2008; Thompson & Balschweid, 1999; Washburn & Myers, 2010). Nolin and Parr (2013) investigated the impact of the agricultural education curriculum on high school graduation exam scores, revealing predictive outcomes in both the language and math sections of the final exam.

Beyond the evaluation of agriculture teachers' perceptions, researchers have also investigated the attitudes of school staff and administrators, including guidance counselors, principals, and superintendents towards agriculture education programs (Dyer & Osborne, 1999; Kalme & Dyer, 2000; Pavelock et al., 2003). Other researchers have investigated the attitudes of school staff and administrators toward science integration in the agriculture program (Brister & Swortzel, 2009;

Thompson, 2001). Few studies have evaluated the perceptions of district or county-wide CTE supervisors concerning academic integration.

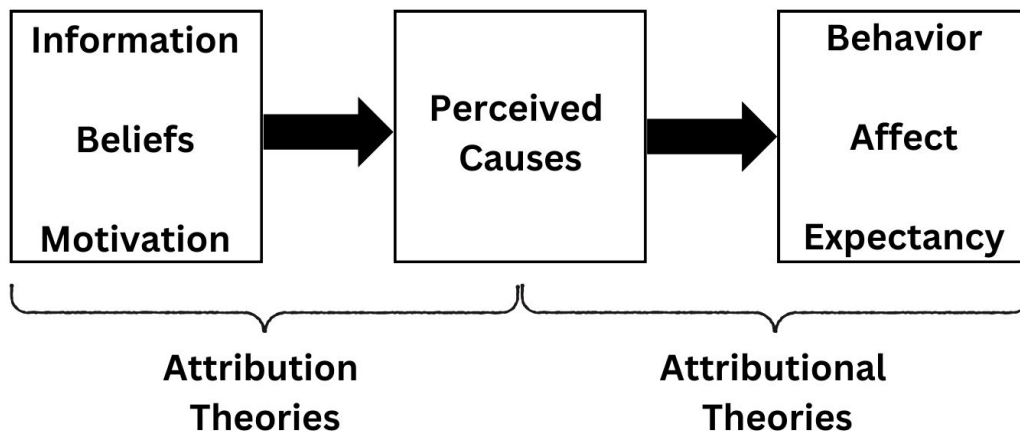
In Florida, CTE teachers have the opportunity to teach a content-area reading intervention course that provides remedial reading instruction within a CTE subject area (ACTE, 2009). In Florida, CTE supervisors' duties may vary between school districts; however, the basic supervisor expectations are similar. CTE supervisors are responsible for overseeing the CTE teachers and programs within the district and managing district Carl Perkins Grant funds, facilitating professional development, and writing programs of study for all CTE programs in the district (Florida State Supervisor, electronic mail communication, August 24, 2012). Given the pivotal role of the CTE supervisor in managing the agricultural education program, this study aimed to explore the perceptions of CTE supervisors regarding core subject area integration in agricultural education courses.

Theoretical Framework

Attribution theory was the theoretical frame used in this study. The basic premise of attribution theory is that "people interpret behavior in terms of its causes and that these interpretations play an important role in determining reactions to the behavior" (Kelley & Michela, 1980, p. 458). The development of attribution theories was guided by the work of Thibaut and Riecken (1955).

Figure 1

Model of Attribution Theory



This theoretical framework suggests the existence of antecedent factors that an individual interprets as influencing the behavior of the target person. These factors encompass information about the consequences of the target person's actions, beliefs regarding how others might behave in the same situation, and the potential impact of the target person's actions on the perceiver's welfare, reflecting a motivational aspect. These three factors serve as the basis for inferring the cause behind the target person's behavior.

In the specific context of this study, CTE supervisors were asked about their perceptions of agriculture teachers' integration of academic subjects, drawing on these three antecedent factors: information, beliefs, and motivation. The attributions made by CTE supervisors based on these factors were anticipated to influence the future behaviors of agricultural teachers. This recognition of the potential impact of attributions on the dynamics between CTE supervisors and agriculture teachers underscored the necessity of conducting this study.

Purpose and Objectives

The purpose of this study was to ascertain the perceptions of CTE supervisors concerning academic integration in the agriculture education program. The specific objectives of this study were:

1. Describe the perceptions of CTE supervisors toward the integration of science, mathematics, and reading into the agricultural education curriculum.
2. Describe the perceptions of CTE supervisors toward agriculture teachers' preparation to integrate science, mathematics, and reading into the agricultural education curriculum.
3. Describe the perceptions of CTE supervisors toward barriers to integrating science, mathematics, and reading into the agricultural education curriculum.
4. Describe the perceptions of CTE supervisors toward the current level of academic integration (science, mathematics, and reading) in the agricultural education curriculum.

Methods and Procedures

This study used a descriptive survey research design. The instrument was based on an instrument used by other researchers in this field of study (Myers et al., 2009). The researchers modified the items slightly to meet the objectives of the study. CTE supervisor responses were measured using ordinal scales. A panel of experts consisting of faculty and graduate students from the University of Florida reviewed the survey instrument for face and content validity. Myers et al. (2009) indicated a post hoc reliability of .80. Since the instrument was adapted, a post hoc reliability analysis was conducted and yielded a Cronbach's Alpha of .99.

The population for the study consisted of all CTE Supervisors in the state of Florida ($N = 75$). The population frame was established from the list of CTE supervisors available on the Florida Department of Education website. Descriptive research limits this study's generalizability to those investigated. The survey followed the tailored design method for online surveys (Dillman et al., 2009). To address non-response errors, a total of four respondent contacts were made (Dillman et al., 2009). These included a pre-study electronic mail contact, instrument mailings via electronic mail, and reminders via electronic mail. The accessible population was $N = 65$. A total of 31 supervisors responded, for a 47.7% response rate.

Results

Demographic information from the respondents was collected. The majority (51.6%) of respondents indicated their age was between 51 and 60 years of age, they had been in their current position for an average of 10 years with a range of 1 to 22 years, the majority (67.7%) of CTE supervisors held a master’s degree, and 32.3% of respondents have previously taught agriculture. The first objective of the study was to describe the perceptions of CTE supervisors toward the integration of science, mathematics, and reading in the agriculture education curriculum. CTE supervisors agreed (87.1%) students learn more about agriculture when science concepts are integral to instruction. Additionally, 87.1% agreed that students are more motivated to learn science when it is integral to the agriculture curriculum. Furthermore, respondents agreed (93.6%) that teaching science concepts in an agriculture class increases the ability to teach problem-solving. However, the majority (71%) of CTE supervisors indicated that integrating science takes more preparation than teaching traditional agriculture curriculum (see Table 1).

Table 1

CTE Supervisors Perception Toward Integration of Science in Agricultural Education Curriculum

Statement	%D	%N	%A	%NA
Integrating science concepts into agriculture classes increases the ability to teach problem solving.	0	3.2	93.6	3.2
Science concepts are easier for students to learn when science is integrated into the agricultural education program.	0	0	93.5	6.5
Students learn more about agriculture when science concepts are an integral part of their instruction.	0	9.7	87.1	3.2
Students are motivated to learn when science is integrated into the agricultural education curriculum	0	9.7	87.1	3.2
Students are more aware of the connection between specific scientific principles and agriculture when science concepts are an integral part of their instruction in agricultural education.	3.2	3.2	83.9	9.7
Agriculture concepts are easier for students to learn when science is integrated into the agricultural education program.	0	16.1	80.7	3.2
Students are better prepared in science after they complete a course in agricultural education that integrates science.	6.4	12.9	77.4	3.2
Integrating science into the agricultural education program requires more preparation than teaching traditional agriculture curriculum.	3.2	22.6	71.0	3.2
Less effort is required to integrate science in advanced agriculture classes as compared to introductory agriculture classes.	51.7	22.6	22.6	3.2
It is more appropriate to integrate science in advanced agriculture classes than into introductory agriculture classes.	64.6	6.5	22.6	6.5

Note. $n = 31$. Original scale: 1 = Strongly Disagree (SD), 2 = Disagree (D), 3 = Neither Agree or Disagree (N), 4 = Agree (A), 5 = Strongly Agree (SA), X = Not Applicable (NA)
 Responses were collapsed into Agree, Neither Agree or Disagree, Disagree, and Not Applicable

Perceptions toward the integration of mathematics indicated that CTE supervisors agreed (67.8%) that students learn more about agriculture when mathematics concepts are an integral part of the curriculum. However, only 48.4% of respondents agreed that students are motivated to learn mathematics when it is integrated into the agriculture curriculum. The majority (80.6%) of CTE supervisors indicated that mathematics concepts are easier for students to understand when they are integrated into the agriculture curriculum. Just over three-fourths (77.5%) of the respondents agreed that students are more aware of the connections between mathematics and agriculture when mathematics concepts are integrated into the agriculture curriculum (see Table 2).

Table 2

CTE Supervisors' Perception Toward Integration of Mathematics in Agricultural Education Curriculum

Statement	%D	%N	%A	%NA
Mathematics concepts are easier for students to learn when mathematics is integrated into the agricultural education program.	0	3.2	80.6	3.2
Integrating mathematics concepts into agriculture classes increases the ability to teach problem solving.	0	3.2	80.6	0
Students are more aware of the connection between specific mathematics principles and agriculture when mathematics concepts are an integral part of their instruction in agricultural education.	0	6.5	77.5	3.2
Students learn more about agriculture when mathematics concepts are an integral part of their instruction.	0	19.4	67.8	0
Agriculture concepts are easier for students to learn when mathematics is integrated into the agricultural education program.	6.4	16.1	67.8	0
Students are better prepared in mathematics after they complete a course in agricultural education that integrates mathematics.	0	16.1	67.8	3.2
Integrating mathematics into the agricultural education program requires more preparation than teaching traditional agriculture curriculum.	6.5	12.9	67.7	0
Students are motivated to learn when mathematics is integrated into the agricultural education curriculum.	6.5	32.3	48.4	0
It is more appropriate to integrate mathematics in advanced agriculture classes than into introductory agriculture classes.	38.8	32.3	29.0	0
Less effort is required to integrate mathematics in advanced agriculture classes as compared to introductory agriculture classes.	45.2	19.4	22.6	0

Note. $n = 31$. Original scale: 1 = SD, 2 = D, 3 = N, 4 = A, 5 = SA, X = NA

Responses were collapsed into Agree, Neither Agree or Disagree, Disagree, and Not Applicable

Two-thirds (67.8%) of respondents agreed that students are more motivated to learn reading when it is integrated into the agriculture curriculum. Also, 70.9% of supervisors agreed that students are better readers after they complete an agriculture course that integrates reading. Again, two-thirds (67.8%) of respondents agreed that integrating reading requires more effort than teaching the traditional agriculture curriculum (see Table 3).

Table 3*CTE Supervisors Perception Toward Integration of Reading in Agricultural Education Curriculum*

Statement	%D	%N	%A	%NA
Students learn more about agriculture when reading strategies are an integral part of their instruction.	0	9.7	77.4	0
Integrating reading strategies into agriculture classes increases the ability to teach problem solving.	0	12.9	74.2	0
Students are better readers after they complete a course in agricultural education that integrates reading.	0	12.9	70.9	3.2
Students are motivated to learn when reading is integrated into the agricultural education curriculum.	3.2	16.1	67.8	0
Agriculture concepts are easier for students to learn when reading is integrated into the agricultural education program.	0	16.1	67.8	3.2
Integrating reading into the agricultural education program requires more preparation than teaching traditional agriculture curriculum.	9.7	9.7	67.8	0
Reading strategies are easier for students to learn when reading is integrated into the agricultural education program.	0	19.4	67.7	0
Less effort is required to integrate reading in advanced agriculture classes as compared to introductory agriculture classes.	41.9	19.4	25.9	0
It is more appropriate to integrate reading in advanced agriculture classes than into introductory agriculture classes.	42	19.4	25.8	0

Note. $n = 31$. Original scale: 1 = SD, 2 = D, 3 = N, 4 = A, 5 = SA, X = NA

Responses were collapsed into Agree, Neither Agree or Disagree, Disagree, and Not Applicable

The second objective of the study was to describe the perceptions of CTE supervisors toward agriculture teachers' preparation to integrate science, reading, and mathematics. Almost two-thirds (64.6%) of respondents agreed that agriculture teachers are prepared to integrate biological science concepts, but only 35.5% and 25.8% of supervisors agreed that agriculture teachers were prepared to integrate mathematics and reading, respectively. At least half of the respondents agreed that agriculture teacher education programs should require more coursework in science, mathematics, and reading strategies (see Table 4).

Table 4*CTE Supervisors Perception of Teacher Preparation to Integrate Core Subject Areas (Science, Mathematics, Reading)*

Statement	%D	%N	%A	%NA
ATEPs should provide instruction for undergraduates on how to integrate core subject areas in agriculture classes.	0	3.2	83.9	0
ATEPs should require that students conduct their early field observations with an agriculture teacher who integrates core subject areas.	3.2	0	80.7	3.2

Statement	%D	%N	%A	%NA
When placing student teachers, ATEPs should expect cooperating teachers to model core subject area integration.	3.2	6.5	77.4	0
ATEPs should require students to take more courses that incorporate reading strategies.	6.5	9.7	71.0	0
I believe agriculture teachers are prepared to teach integrated biological science concepts.	9.7	12.9	64.6	0
ATEPs should require students to take more science courses.	9.7	16.1	61.3	0
ATEPs should require students to take more mathematics courses.	12.9	22.6	51.6	0
I believe agriculture teachers are prepared to teach integrated physical science concepts.	16.1	22.6	48.4	0
I believe agriculture teachers are prepared to teach integrated mathematics concepts.	22.6	29.0	35.5	0
I believe agriculture teachers are prepared to teach reading strategies.	35.5	25.8	25.8	0

Note. $n = 31$. Original scale: 1 = SD, 2 = D, 3 = N, 4 = A, 5 = SA, X = NA

Responses were collapsed into Agree, Neither Agree or Disagree, Disagree, and Not Applicable

The third objective of this study was to describe CTE supervisors' perceptions toward barriers to integrating core subject areas in the agriculture curriculum. Nearly two-thirds (or more) respondents cited lack of experience in core subject area integration as a barrier to implementation. Nearly three-quarters (74.2%) of supervisors agreed that teachers may feel they have insufficient time and support to plan for integration. Over two-thirds (71%) of the respondents agreed that teachers insufficient background knowledge in core subject areas is a barrier to integration.

The final objective of this study was to evaluate CTE supervisors' perceptions of the current level of core subject area integration in agriculture. Over three-fourths (80.6%) of respondents indicated that programs within the district integrate science, but 74.2% indicated they were not satisfied with the level of integration in the agriculture education programs within the district with similar results seen regarding perceptions with mathematics and reading integration. Furthermore, CTE supervisors were asked about the district's plan to alter core subject area integration. Over half of supervisors indicated a plan to increase integration in all areas (science, mathematics, and reading) of the agriculture curricula.

Conclusions and Discussion

Since not all participants responded, and this study is specific to Florida, caution must be exercised when generalizing the results of this study beyond the population. Attribution theory was used to frame this study. In the case of this study, attribution theory postulates that the perceptions of CTE supervisors toward an agriculture teacher's integration of core subject areas is based on the CTE supervisors' perceptions of the three antecedent factors. CTE supervisors determine causes for the teacher's behavior based on the developed perceptions.

This study's findings indicate that CTE supervisors have positive perceptions of the agriculture teacher's ability to integrate core subject areas and the importance of integration. Based on attribution theory, it can be concluded that agriculture teachers will continue to integrate core subject areas in the agriculture education program and teachers will continue to integrate core subject areas at a high level, due to the positive perceptions held by CTE supervisors. Further investigations into student learning and measurable quasi-experimental studies to showcase beyond perceptions is warranted. Overall, perceptions toward the integration of science, mathematics, and reading were similar. Seventy-five percent of CTE supervisors agreed that the integration of science, mathematics, and reading increases the opportunity for problem solving to be taught. Agriculture provides an integrated contextual application for the use of applied science, math, and the use of reading strategies. Overall, these results are like those results found by Thompson (2001) concerning high school principals' perceptions toward science integration. Further showcasing that CTE and school administration believe in the value-added potential that school-based agriculture offers students for cross-curricular learning.

CTE supervisor's perceptions of science integration were more positive than perceptions of mathematics integration. Eighty-seven percent of supervisors perceived that students were more motivated to learn science when it was integrated into the agriculture curriculum, whereas only forty-eight percent of supervisors felt that students were more motivated to learn mathematics when it was integrated into the agriculture curriculum. Anecdotally, agriculture teachers are more comfortable with science integration and the connection is stronger among agriculture applications in comparison to mathematics. CTE supervisors felt most confident in an agriculture teacher's ability to integrate biological science concepts, just as Brister and Swortzel (2009) found when surveying school counselors and administrators.

CTE supervisors do perceive that preservice teachers need to receive specific instruction on core subject area integration and have early field experiences with cooperating teachers that model core subject area integration. Additionally, CTE supervisors indicated that agriculture teachers needed to diminish emphasis on production agriculture. CTE supervisors believe the biggest barriers to integration of core subject areas in agriculture education is the inexperience of the agriculture teacher with core subject area integration, and the lack of time and support for integration. As agriculture teachers care of laboratory spaces and in some instances farms and livestock, consideration of additional non-instructional staff should be considered so that agriculture teachers could focus more of their instructional and preparation time for integration and application-based laboratories. Other notable barriers indicated were the lack of funding and materials necessary for academic integration.

Recommendations

Based on the findings, conclusions, and discussion the recommendations for teachers and schools in practice begin with continuing the integration of core subject areas into the agricultural education program. There should be more professional development provided for agriculture teachers in core subject areas to account for the additional time and effort required for integration. A stronger focus on math integration is needed. The focus on teacher professional development should be less on how to integrate, but more on where science and math are happening naturally within the context of agriculture. Then use those applications to highlight

the science and math that exists in the curriculum. This will better enable agriculture teachers to teach agriculture as the integrated science and stay true to the context of teaching in and about agriculture.

It is also recommended that schools provide an additional planning period common with a core subject teacher so that teachers have more time to integrate core subjects across their instruction. Recommendations for teacher preparation programs, following this research, include more science, mathematics, and reading strategy courses (or selection of better courses to enable preservice teachers to integrate core subject areas). Specific instruction in integration from teacher educators and engaging with agriculture education programs that integrate core subjects. Showcasing programs where this exist will develop a trend of agriculture being the place for application and student knowledge gain in the core academics.

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