Effects of Agricultural Sales CDE Modules on Content Knowledge and Argumentation Skill

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Abstract

The purpose of this study was to determine the effects of the type of training module on argumentation skill, student content knowledge achievement, and performance in an agricultural sales practicum completed by secondary school agriculture students. Current research has concluded that most students do not possess the academic or transferable skills to be successful in the workplace. This quasi-experimental study sought to evaluate students' development of academic and transferable skills through the use of researcher-developed agricultural sales training modules. Two sets of training modules were used, one with and one without argumentation infused into the lessons. Results indicated that both groups of students had increases in content knowledge and argumentation skill; further, there was no statistically significant difference between groups.

The National Commission on Mathematics and Science Teaching for the 21st Century called the educational situation in the United States dismal, which reported that students' level of performance in mathematics and science is unacceptable (USDE, 2000). In addition to the current educational situation with regards to mathematics, reading, and science, there remains concern over students' development of transferable skills. Transferable skills are skills that can be acquired and applied in a variety of settings. Examples of transferable skills include communication skills, problem solving and analytical skills, and teamwork (USC, 2012). In 2003, a special assessment in problem solving indicated that the U.S. ranked 29th out of 40 countries when comparing the problem solving abilities of 15-year-old students (Partnership for 21st Century Skills, 2008).

Unfortunately, government reporting agencies have not been the only groups that have reported data which indicate a trend towards weakened U.S. student proficiency. Recently, employers have noted the lack of academic and transferable skills in young hires. Although employers have been expecting new hires to possess these skills, students have not been meeting these expectations. Employers cited high school graduates as deficient in mathematics, reading comprehension, written communications, critical thinking/problem solving, and professionalism/work ethic. More than 40% of employers stated that new hires with a high school diploma were deficient in overall preparation for an entry-level job (Casner-Lotto, 2006).

Billing (2003) conducted an international study of career skills sought by employers and discovered that problem solving was among the most highly regarded. Additionally, critical thinking has been highlighted as essential for successful job performance (Casner-Lotto, 2006). The combination of problem solving and critical thinking has resulted in a skill termed "argumentation" (Cerbin, 1988). Cho and Jonassen (2002) defined argumentation as requiring individuals to identify problems, identify alternative viewpoints, and develop support for their solution, using facts and evidence. University of Cambridge (2011) cited argument and analysis as

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a transferable skill necessary for success in school and beyond. Recently, education experts have cited the process of using evidence to make arguments and engaging in arguments as a skill that has substantial academic value (Lynn & Canter, 2012). However, students have not been able to construct well-structured arguments and have been unable to connect their claims to evidence, which is essential for problem solving (Cho & Jonassen, 2002).

Based on the aforementioned findings, students could benefit from instruction on how to develop transferable skills. Bancino and Zevalkink (2007) proposed that transferable skills should be taught in Career and Technical Education (CTE) programs. Since secondary CTE programs have been suggested as a vehicle to help students develop these skills, agricultural education ought to provide a context for students to learn transferable skills (Dailey, Conroy, & Shelley-Tolbert, 2001). The agricultural education mission has been to "prepare students for successful careers in the global agriculture, food, fiber, and natural resources systems" (National FFA Organization, 2012a, para. 1). Career preparation and success has been a large component of agricultural education and has been accomplished through classroom instruction and Career Development Events (CDEs) (National FFA Organization, 2012a). The National FFA Organization stated that the goal of a Career Development Event is to accomplish the purposes of agricultural education while developing responsibility, teamwork, and communication skills, and promoting ethical competition and achievement. Additionally, the National FFA Organization stated that activities in each CDE can include elements of problem solving, critical thinking, and teamwork skills, as well as focusing on the future needs of society (Scholer, 2012). Ultimately, students should have a base level of technical knowledge in an agricultural field as well as certain transferable skills which have been developed through participation in a CDE.

As the United States has continued to grow, and the American workplace has become increasingly globalized, education of citizens will be a key to success. An educated citizen group has been needed to support the growing nation and ensure the ability of the United States to continue to compete on the global stage (USDE, 2000). However, the lack of student knowledge in academic areas and the low argumentation skill capacity of students have not presented a promising picture for the United States. Employers noted that eligible candidates either do not possess the technical skills or do not possess the "soft" skills (communication skills or argumentation skill) to be successful in the position (Dahl, 2012). Therefore, the problem this study investigated was the lack of argumentation skill among secondary school students.

Theoretical Framework

Constructivism was the overarching framework guiding this study. Constructivism focuses on the interactions between people and situations and the acquisition of knowledge based upon experiences. Constructivism acknowledges an active role in learner construction of knowledge. Constructivism is not a theory by definition but rather an explanation about the nature of learning (Schunk, 2004).

Constructivism assumes that "people are active learners and must construct knowledge for themselves" (Schunk, 2004, p. 287). In a constructivist approach, knowledge is not imposed from the outside but rather constructed based upon the learners own understanding. Schunk (2004) purported that constructivism is founded in the Sociocultural Theory of Vygotsky (Vygotsky, 1978) and Piaget's Theory of Cognitive Development (Piaget, 1972).

This study was based on situated cognition. Situated cognition suggests that learning is specific to the situation in which it occurs (Anderson, Reder, & Simon, 1996). Situated cognition is focused around using cognitive apprenticeships where "knowledge and skills learning are integrated in their social and functional contexts" (Jimenez-Aleixandre & Erduran, 2008, p. 6). During situated cognition, learning is a by-product of a learner being engaged within a context where knowledge is naturally embedded (Choi & Hannafin, 1995). Brown, Collins, and Duguid (1989) argued that the activity in which knowledge is developed is not separate from learning and

cognition, but rather an integral part of what is learned. The authors contended that situations produce knowledge through activity (Brown, Collins, & Diguid, 1989).

Literature Review

Osborne, Erduran, and Simon (2004) explained argumentation as "the coordination of evidence and theory to support or refute an explanatory conclusion, model, or prediction" (p. 995). Most literature discussed argumentation in relation to the development of scientific reasoning. Osborne et al. discussed argumentation in terms of scientific instruction. However, argumentation can be used to make personal and ethical decisions about a wide range of issues, based upon information provided through the media (Osborne, Erduran, & Simon, 2004). Using argumentation has two functions: to engage learners in conceptual understanding and to make thinking and reasoning evident for teacher assessment (Osborne et al., 2004).

Kuhn (1992) conducted a study of argumentation that included 160 individuals ranging in age from ninth grade to older adults and ranging in education level. Kuhn found that only 40% of individuals were able to generate genuine evidence to support their claim. There were no significant differences in ability to argue the claim among age levels. However, a greater percentage of individuals with a college education were able to generate genuine evidence in their argument as opposed to those without a college education (Kuhn, 1992).

Zohar and Nemet (2002) investigated argumentation skill development among ninth grade students at two different schools. Students in the control group were taught genetics concepts using conventional methods, while students in the experimental group were with curriculum that was designed to foster the development of higher order thinking skills and scientific argumentation in high school students. Results showed that students in the experimental group scored significantly higher than students in the control group on a test of genetics knowledge, and there was an increase in the number of justifications and the complexity of the arguments used by those students (Zohar & Nemet, 2002).

Thoron (2010) conducted a quasi-experimental study of 437 high school agriscience students that investigated teaching methods' effect on argumentation skill. Results indicated that students who were taught using inquiry-based instruction had higher argumentation scores than those who were taught using the subject matter approach (Thoron, 2010). In addition to argumentation skill, this study also examined student content knowledge achievement. Content knowledge in agricultural education has been examined through quasi-experimental studies in which students were given treatments that utilized different teaching methods. Flowers and Osborne (1988) compared the effects on student achievement between the problem solving approach and the subject matter approach in vocational agriculture. The researchers found that there was no difference in student achievement between the problem solving approach to teaching and the subject matter approach (Flowers & Osborne, 1988).

Boone (1988) sought to determine if the problem solving approach to teaching had an effect on student achievement and retention of agricultural knowledge. Ninety-nine freshman students enrolled in production agriculture in Ohio participated in the study. Results from the study showed that the problem solving approach to teaching increased the level of student retention of agricultural knowledge. Since the problem solving approach allows students to solve real problems using the scientific method where students test the potential solutions and evaluate the results, there is a greater level of knowledge retention (Boone, 1988).

Burris (2005) looked at the development of content knowledge among 140 Missouri agriculture students whose teachers were purposively selected to participate in the study. Seventy-seven students received instruction via the problem-based learning method, while 63 students received instruction though the supervised study method. Burris found that supervised study method of instruction resulted in higher gain scores in content knowledge, but suggested that supervised study may not be the most efficient method for accomplishing education objectives that

are assessed at higher levels of cognition (Burris, 2005). Thoron (2010) also evaluated the content knowledge achievement of high school agriscience students in the study. Results indicated that students taught by inquiry-based instruction achieved significantly higher scores on all content knowledge exams over the 14 week study.

In consideration of student performance in a practicum, Bandura (1989) stated that self-efficacy is an individual's belief in his/her ability to perform well. Alfred, Hansen, Aragon, and Stone (2006) suggested that high self-efficacy can result from participation in Career and Technical Student Organizations (CTSO). Alfred et al. sought to determine the effects of participation in CTSO's on students' high school experience. The study included 1,797 high school students from 10 different states across the nation. The researchers looked at students who were involved in the CTSO, students who were in a CTE class but did not have the option to participate in a CTSO, and students who were not in a CTE class at all. The researchers found that involvement in a CTSO resulted in higher levels of career self-efficacy compared to enrollment in a CTE class alone, and greater levels of involvement in a CTSO were positively correlated with a student's career self-efficacy. Results indicated that participation in competitive events had significantly positive effects on career-self efficacy (Alfred et al., 2006).

Purpose, Objectives, and Hypotheses

The purpose of this study was to determine the effects of the type of training module on argumentation skill development, student content knowledge achievement, and performance in an agricultural sales practicum completed by secondary school agriculture students. The specific objectives of this research were as follows:

1. Describe the ethnicity, gender, and year in school of agriculture secondary school students who participate in the agricultural sales practicum in Florida.
2. Ascertain the relationship between the use of training modules and the development of student argumentation skill, content knowledge achievement, and performance in the agricultural sales practicum.
3. Examine the relationships among argumentation skill, content knowledge achievement, performance in an agricultural sales practicum, ethnicity, gender, and year in school of agriculture secondary school students who participate in the agricultural sales practicum.

For the purpose of statistical analysis, the other research questions were posed as null hypotheses. All null hypotheses were tested at the .05 significance level.

H_{o1}— There is no significant difference in student content knowledge achievement based upon the type of training module (argumentation infused vs. no argumentation infusion).

H_{o2}— There is no significant difference in student argumentation skill based upon the type of training module (argumentation infused vs. no argumentation infusion).

H_{o3}— There is no significant difference in performance in the agricultural sales practicum based on the type of training module (argumentation infused vs. no argumentation infusion).

Methods

Population and Sample

The population of this study was Florida high school agriculture students. The accessible population was high school agriculture students of agriculture teachers who participated in the Agricultural Sales CDE professional development workshop in Florida. A convenience sample was selected according to the interest of the teacher for participation in the Agricultural Sales CDE. Since all teachers may not have an interest in this CDE, a simple random sample of teachers to participate in the study was not possible; therefore, convenience sampling was used which resulted

in participation from 9 teachers. Randomization of intact groups for treatment (argumentation infused) and control (training modules without infused argumentation) was used.

Research Design

The independent variable in this study was the type of training modules developed for use in preparing an agricultural sales practicum team. The group that acted as the control received agricultural sales training modules without argumentation infused while the treatment group received agricultural sales training modules with argumentation infused. The modules were used to prepare a team of four students. The dependent variables in the study were argumentation skill, content knowledge achievement, and performance in an agricultural sales practicum. This study utilized a quasi-experimental design. This design was used because subjects could not be randomly assigned to treatment groups because teachers self-registered for participation in the agricultural sales professional development workshop. Additionally, intact groups were used because students could not be randomly assigned to agriculture teachers. The study followed a nonequivalent control group design (Campbell & Stanley, 1963).

All students were taught using the prepared modules. Students completed a content knowledge pretest and an argumentation pretest prior to the modules being taught. Following the completion of the modules, each student took a content knowledge posttest, argumentation posttest, and participated in the agricultural sales practicum.

T- $O_{pretest}$ $O_{argumentation}$ X_1 $O_{posttest}$ $O_{argumentation}$ $O_{practicum}$

C- $O_{pretest}$ $O_{argumentation}$ X_2 $O_{posttest}$ $O_{argumentation}$ $O_{practicum}$

Campbell and Stanley (1963) noted regression as a concern in a quasi-experimental design but explained that regression is avoidable and can be minimized if subjects are not selected on extreme scores. Since the treatment was randomly assigned, and intact groups were used, regression as a threat to internal validity was not a concern. Interaction effects pose the largest threat to internal validity in this design type. Interaction effects are when other threats to internal validity interact with the selection of groups in quasi-experimental designs. These interactive effects could be mistaken for the effect of the treatment (Campbell & Stanley, 1963). Through the use of a pretest and posttest, interaction effects with history, maturation, testing, and instrumentation were controlled. The use of randomized treatment groups and anonymity of treatment assignments helped control for interaction effects in relation to internal validity. Each group was located at separate schools, thus controlling for any interaction which would identify those who received the treatment.

Both teaching ability and implementation of the training modules was a concern in this study. Boone (1988) recommended that professional development be provided to instructors in order to properly deliver the treatment. This study addressed Boone's recommendation by providing a one-day professional development session to the instructors on how to properly implement the training modules provided. Teaching ability of the agriculture teachers in the study was controlled using several methods. Agriculture teachers self-selected to participate in the study, which resulted in varying teaching abilities. Since teachers received professional development, and teachers were interested in the material due to self-selection, differences in ability were buffered.

Training Modules

Eight training modules for this study that aligned with coursework in the area of agricultural sales were developed by the researcher. The content of the training modules was designed based upon the Agricultural Sales CDE. The researcher used content from the Selling

Strategically course taught by Dr. Allen Wysocki at the University of Florida. This course was used as the basis for development of the Agricultural Sales CDE materials. The complete set of modules was developed, and then argumentation was infused within the set, resulting in two different sets of training modules.

Training modules that were infused with argumentation contained an extra component for four of the eight modules. In the argumentation-infused modules, the agriculture teachers were provided with supplemental information and questions to use with their students. Teachers were asked to lead a discussion using the questions provided, which was based on the scenario that the student utilized in the module. The discussion and questions required students to evaluate the conclusions that were reached in the scenario, use facts from the scenario to evaluate alternative conclusions, and then determine the best solution based upon the facts presented. Scenarios presented in each module were different; however, the basis of the argumentation infusion was the same for each of the four modules.

The training modules were evaluated for content validity by the state extension specialist in agricultural sales. This expert determined that the modules were appropriate for preparation for the CDE, and an appropriate length of time was provided to prepare the CDE team. The argumentation-infused training modules were evaluated for face and content validity by an expert in argumentation. The expert determined the argumentation infusion for the training modules followed an appropriate format to develop argumentation skill.

Instrumentation

In order to measure student prior knowledge and establish base-line knowledge for each group, a content knowledge pretest and posttest were used. The pretest and posttest were developed by the state extension specialist in agricultural sales, based upon the Selling Strategically course taught at the University of Florida, which was used as the basis for the Agricultural Sales CDE. The pretest and posttest each consisted of 27 items, but the tests were not identical. Questions of similar type and kind were grouped together based on content in the module and then a random selection of questions was used to develop the pretest and posttest. Equal numbers of questions were taken from each group of questions using the developed matrix. Each test was similar in design and difficulty to what would be utilized when competing in the state Agricultural Sales CDE. Since the assessment was developed by the specialist, content validity was not a concern; however the assessment was validated by an educational expert. Since the content knowledge exam was multiple choice, the instrument was analyzed using a Cronbach's alpha, yielding a coefficient of .72.

A researcher-adapted scoring rubric originally developed by Schen (2007) was utilized to assess argumentation skill. The scoring rubric was used in conjunction with a researcher-developed argumentation instrument. An argumentation instrument was developed which served as the pretest and posttest. The researcher scored each student response on the argumentation instrument using the argumentation scoring rubric. Scores on the rubric were assigned based on the quality of the response in the categories of claim made, grounds used, warrants given, counterarguments generated, and rebuttals offered. Face and content validity of the instruments was determined by an expert in argumentation from the Department of Agricultural Education and Communication at the University of Florida. The expert determined that the researcher-developed instruments were valid. After completion of the researcher-scored argumentation instruments, an expert selected a random sample from each group (training modules pre- and post-) for a double blind review to obtain inter-rater reliability. Researcher scores were determined to be consistent.

The agricultural sales practicum was developed by the state extension specialist in agricultural sales with assistance from the researcher. Each agriculture teacher who initially participated in the professional development training brought one team (four students) of high school agriculture students to participate in the agricultural sales practicum. The practicum

consisted of a written exam (posttest), a team sales activity, and an individual sales call, completed by each student. The structure of the practicum was identical to the state CDE in agricultural sales. The written exam was the content knowledge achievement exam posttest developed by the state's extension specialist in agricultural sales.

The team activity required students to demonstrate teamwork, group dynamics, problem solving, data analysis, decision making, and oral communications (Florida FFA Career Development Event Handbook, 2011). The team event was scored by three undergraduate students using a scoring rubric. Students selected to judge were enrolled in the Selling Strategically course and were selected based on their superior performance in the course. This is the same manner in which judges are selected to score the state CDE. Each judge scored the team individually and then judges' scores were averaged to reach one score for each team.

The individual sales activity required students to sell a product to a prospective buyer (judge). The student was scored by the two judges using a rubric. Judges scored each student individually and then judges scores were averaged to determine one score for each student.

For both the team sales activity and the individual sales call, there were multiple pairs of judges. After all judging was completed, a calibration process was conducted to ensure that scores were equally assigned between judging rooms. Judges were asked to describe the performance of the student(s) that resulted in the score assigned. If similar performance was described, scores were adjusted to ensure equality between judging rooms.

Findings

The results address the objectives and hypotheses of the study in determining the influence of the type of training module on the development of content knowledge and argumentation skill. The total group consisted of 37 students from nine different schools across [State]. In addition to providing professional development to ensure fidelity of treatment, teachers were also asked to complete a log sheet for each module. Based on the teacher log sheet, teachers spent 21-24 hours preparing students for the agricultural sales practicum.

The first objective was to describe the ethnicity, gender, and year in school of students who participated in the agricultural sales practicum in Florida. Participant ethnicity was categorized into the groups of White, Black, Hispanic, Asian and Other. The majority of students in this study self-identified themselves as White (91.9%). The ethnicity was similar between groups (Table 1). The majority of participants in this study (56.8%) were male. Gender among treatment groups varied from the overall sample. Nearly 42% of the control group was male compared to just over 72% in the treatment group.

Of the 37 students who participated, 10.8% (n=4) were in ninth grade, 32.4% (n=12) were in tenth grade, 35.1% (n=13) were in eleventh grade, and the remaining 21.6% (n=8) were in twelfth grade (Table 4-6). Those participants in the control group had a grade level distribution that was similar to the overall sample. Those in the treatment group had a grade level distribution that varied from the overall sample, but each grade level was still represented.

Table 1

Participant Ethnicity, Gender, and Grade Level (n = 37)

| | Treatment Group | | | | Total (*n*=37) | |
| | Without (n=19) | | With Argumentation (n=18) | | | |
	n	%	*n*	%	*n*	%
Ethnicity						
White	17	89.5	17	94.4	34	91.9
Black	0	0	0	0	0	0
Hispanic	0	0	0	0	0	0
Asian	0	0	0	0	0	0
Other	2	10.5	1	5.6	3	8.1
Gender						
Male	8	42.1	13	72.2	21	56.8
Female	11	57.9	5	27.8	16	43.2
Grade Level						
Ninth	1	5.3	3	16.7	4	10.8
Tenth	7	36.8	5	27.8	12	32.4
Eleventh	8	42.1	5	27.8	13	35.1
Twelfth	3	15.8	5	27.8	8	21.6

Note. Without= Training modules without argumentation infused; With argumentation=training modules infused with argumentation.

The second objective sought to ascertain the relationship between the use of training modules and the development of student argumentation skill, content knowledge achievement, and performance in an agricultural sales practicum. Each student's content knowledge achievement was determined using a content knowledge instruments developed by the state extension specialist in agricultural sales. The maximum possible score on the instruments was 100. Pretest data were collected from 37 participants with an overall mean of 35.97 (SD=10.77). The control and treatment groups achieved similar scores and standard deviations, with the control group achieving a higher pretest mean score (Table 2). Posttest data were collected from 37 students. The overall mean of the content knowledge achievement posttest was 52.54 (SD=9.23).

Table 2

Participant Mean Pretest and Posttest Scores (n=37)

	Treatment Group				Total	
	Without		With Argumentation			
Instrument	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pretest	36.89	11.57	35.00	10.1	35.97	10.77
Posttest	55.32	10.53	49.61	6.72	52.54	9.23

Note. Without= Training modules without argumentation infused; With argumentation=training modules infused with argumentation.

The student argumentation skill instrument was used to determine the student's level of argumentation prior to the treatments and following the treatments (training modules without argumentation and training modules infused with argumentation). The overall mean score for the argumentation pretest was 3.53 (SD=2.31) of a possible 10. The overall mean score for the posttest was 5.59 (SD=1.85) of a possible 10 (Table 3). Each student's argumentation skill was determined using Schen's (2007) scoring rubric to measure argumentation skill. The pretest mean was higher for the treatment group than the control group, but the mean score for the posttest was higher for the control group than for the treatment group.

Table 3

Participant Mean Argumentation Scores (n=37)

	Treatment Group				Total	
	Without		With Argumentation			
Instrument	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pretest	3.37	2.41	3.71	2.26	3.53	2.31
Posttest	5.74	1.66	5.44	2.06	5.59	1.85

Note. Without= training modules without argumentation infused; With argumentation=training modules infused with argumentation.

An agricultural sales practicum, identical in nature to the FFA Agricultural Sales CDE, was utilized as a context for measuring content knowledge and argumentation skill. The practicum consisted of a written exam (posttest), a team sales activity, and the individual sales call. The breakdown of points was: written exam- 100 points x 4 team members equaling 400 points total; team sales activity- 150 points; and the individual sales call- 150 points x 4 team members equaling 600 points; there was a total of 1150 points in the practicum. The practicum was used to determine the performance of student participants following the treatment (training modules without argumentation or training modules with argumentation).

       The overall mean score for the individual sales call was 105.65 (SD= 33.27) out of a possible 150 points. Students in the control group earned higher achievement scores in the individual sales call and had a smaller standard deviation. The overall mean score for the team sales scenario was 124.51 (SD=20.65) out of a possible 150 points. Students in the treatment group earned higher achievement scores in the team sales scenario. The overall mean team scores for the entire practicum (content knowledge posttest, individual sales call, and team sales scenario of the whole team) was 757.22 (SD=118.863) (Table 4).

Table 4

Participant Practicum Performance Scores (n=37)

| | Treatment Group | | | | | |
| | Without | | With Argumentation | | Total | |
Practicum Event	*M*	*SD*	*M*	*SD*	*M*	*SD*
Individual Sales Call	108	30.01	103.17	37.11	105.65	33.27
Team Sales Scenario	117.74	25.73	131.67	9.81	124.51	20.65
Content Knowledge Exam	55.32	10.53	49.61	6.72	52.54	9.23
Overall Team Score	743.80	160.582	774.00	51.166	757.22	118.863

Note. Without= training modules without argumentation infused; With argumentation=training modules infused with argumentation.

       The third objective examined the relationship among argumentation skill, content knowledge achievement, performance in the agricultural sales practicum, ethnicity, gender, and year in school of agriculture secondary school students who participated in the agricultural sales practicum. Prior to any inferential analysis of the data, all variables were examined for correlations. For the purpose of this discussion, the terminology utilized by Davis (1971) was used to indicate the strength of the correlations. Pearson Product Moment correlations were used to determine the relationships between the variables (Table 5).

       The content knowledge posttest scores were found to have a moderate relationship with the practicum individual sales call and a substantial relationship with the overall team score. The argumentation posttest reported low correlations with gender and moderate correlations with the individual sales call. The team sales scenario performance reported moderate correlations with the treatment variable. The individual sales call had moderate correlations with grade level and gender (Table 5).

Table 5

Correlations Between Variables

Variable	1	2	3	4	5	6	7	8	9
1. Content Knowledge Posttest	--	.23	.01	.41	.53	.17	.09	-.16	-.31
2. Argumentation Posttest		--	.02	.32	.18	-.16	.22	-.04	-.08
3. Team Sales Scenario			--	.27	.57	-.10	.01	-.08	.34
4. Individual Sales Call				--	.59	.31	.30	-.27	-.07
5. Overall Team Score					--	.19	.07	-.06	-.06
6. Grade Level						--	.01	.00	.00
7. Gender							--	.14	-.30
8. Ethnicity								--	-.09
9. Treatment									--

The first null hypothesis stated there is no significant difference in student content knowledge achievement based upon the type of training module used. Student content knowledge mean scores were analyzed between groups through analysis of covariance technique. Student pretest score was utilized as a covariate to adjust for achievement prior to the treatment. Following the treatment, students who were taught with the argumentation infused training modules reported a mean posttest score of 49.61 (SD=6.72) and those taught with the training modules without argumentation had a mean score of 55.32 (SD=10.53). This difference in posttest scores was found to be statistically significant $F(247) =4.021$, $p=.023$ (Table 4-13). Based upon these findings, the null hypothesis of no significant difference in content knowledge achievement due to type of training method was rejected. Students in the control group scored significantly higher than students in the treatment group in content knowledge achievement.

The second null hypothesis stated that there is no significant difference in student argumentation skill based upon the type of training module. Students' argumentation skill scores were calculated by the use of Schen's (2007) rubric. Student argumentation pretest score was utilized as a covariate to adjust for achievement prior to the treatment. Following the treatment, students who were taught with the argumentation infused training modules reported a mean posttest score of 5.35 (SD=2.09) and those taught with the training modules without argumentation had a mean score of 5.74 (SD=1.66). The univariate analysis of covariance [$F(2) =2.66$, $p=.09$] revealed there was not a statistically significant difference at the alpha level of .05 between the students taught with training modules infused with argumentation and training modules without argumentation infused. Based upon these finding, the researcher failed to reject the null hypothesis. This indicated that there was not a significant difference in development of argumentation skill between the treatment and the control group.

The final null hypothesis stated that there is no significant difference in performance in the agricultural sales practicum based upon the type of training module. Performance in the agricultural sales practicum was measured by the performance score for two components of the practicum (individual sales call and team sales scenario) and the overall team score for the event (which included the individual sales call, the team sales scenario and the content knowledge posttest for all four members of the team). A pretest was not used as a covariate for this analysis; therefore a simple analysis of variance was used with scores obtained following the treatment. In the individual sales call, students who were taught using the training modules infused with argumentation had a mean score of 103.17 (SD=37.11) and those taught using the training modules without argumentation had a mean score of 108 (SD=30.01) (Table 6) . The analysis of variance [$F(216),=.19$, $p=.67$] revealed there was not a statistically significant difference between the treatment and control groups in the individual sales call of the agricultural sales practicum.

In the team sales scenario, students who were taught using the training modules infused with argumentation had a mean score of 131.67 (SD=9.81) and those taught using the training modules without argumentation had a mean score of 117.74 (SD=25.73) (Table 6). The analysis of variance [$F(1,794),=4.63, p=.04$] revealed there was a statistically significant difference between the treatment groups, indicating that students in the treatment group performed better than students in the control group in the team sales activity of the agricultural sales practicum.

The overall team score (which included the content knowledge posttest, the individual sales call, and the team sales activity for all four members of the team), students who were taught using the training modules infused with argumentation had a mean score of 774.00 (SD=51.166) and those taught using the training modules without argumentation had a mean score of 743.80 (SD=160.582) (Table 6). The analysis of variance [$F(2027),=.13, p=.73$] revealed there was not a statistically significant difference between the treatment groups. Based on the findings of the individual sales call, the team sales scenario and the overall team score, the null hypothesis failed to be rejected, indicating that there was no significant difference in performance in the agricultural sales practicum based upon treatment group.

Table 6
Practicum Performance Scores by Treatment (n=37)

| | Treatment Group | | | |
| | Without | | With Argumentation | |
Practicum Event	*M*	*SD*	*M*	*SD*
Individual Sales Call	108	30.01	103.17	37.11
Team Sales Scenario	117.74	25.73	131.67	9.81
Content Knowledge Exam	55.32	10.53	49.61	6.72
Overall Team Score	743.80	160.582	774.00	51.166

Note: Without= training modules without argumentation infused; With argumentation=training modules infused with argumentation.

Conclusions

The sample used in this study was not randomly drawn from the population due to the use of intact groups. With this limitation in mind and based on the findings of this study, the following conclusions were drawn:

1. *Demographics:* The majority of participants in this study were White (91.9%), male (56.8%), and in the eleventh grade (35.1%). The ethnicity and grade level was similar between the treatment and control group.
2. *Content Knowledge:* All students showed gains in content knowledge regardless of type of training module. Students taught using training modules without argumentation infused scored higher on the content knowledge assessment than students taught using training modules infused with argumentation.
3. *Argumentation Skill:* All students showed gains in argumentation skill score regardless of type of training module. Students taught using training modules without argumentation scored higher on the argumentation skill instrument than students taught using training modules infused with argumentation.
4. *Relationship with Variables:* Student demographic variables had low to negligible relationships with content knowledge achievement and argumentation skill score. Grade level and gender

had moderate correlations with the individual sales call in the Agricultural Sales practicum. Performance in the team sales scenario and the individual sales call had substantial correlations with overall team score.

5. *Treatment Effects:* Students taught using training modules without argumentation infused scored higher on the individual sales call than those taught using training modules infused with argumentation. Students taught using training modules infused with argumentation scored higher on the team sales scenario than those taught using training modules without argumentation infused.

Discussion and Implications

This study presents findings which indicated that agricultural sales training modules are effective in developing content knowledge and argumentation skill among secondary school agriculture students. However, this study also indicated that the treatment of infusing argumentation into the agricultural sales training modules was not effective in seeing additional gains in content knowledge and argumentation skill. In Thoron's (2010) study where the subject matter approach and inquiry-based instruction were compared based on students' development of content knowledge, argumentation skill, and scientific reasoning, treatment effects were present. In other studies (Boone, 1988; Flowers & Osborne, 1988) results based upon the use of two different teaching methods indicated mixed results. However, the parameters of this study were much different than the previously mentioned, thus the study yielded different results.

The parameters of this study were different than many teaching methodology studies. First, this study was not linked directly to a specific agriculture course. Teachers who elected to participate in this study prepared students for the practicum after school hours. Additionally, student participation in the study was voluntary. Since participation was voluntary and this was not a state-sponsored event, a student may not have felt it necessary to perform at the level in which they would for the official state CDE. In other studies, a student's performance had a direct effect on the student's grade; however, that was not the case in this study—there was no grade incentive/punishment for participation. This could also be a factor that affected a student's motivation to participation. In contrast, participation in this practicum allowed students an opportunity to learn, practice, and compete in this CDE area without bearing on their performance. The ability to have a trial run could have motivated students to perform well for future CDE opportunities. Finally, the last component of the study that was unlike others was the length of time. The study was conducted over a six week period of time. Other studies that have seen significant treatment effects, such as Thoron (2010), were conducted over a period of twelve weeks. Additionally, Thoron indicated that if the study was concluded at four weeks, there would have been no treatment effects, and after eight weeks results would be mixed. Thus, the shorter time period is dissimilar to other studies, and it is a shorter period to seek treatment effects. However, after discussion with agriculture teachers, six weeks was determined as an adequate amount of time to prepare a CDE team. Choosing a longer period of preparation time would not have been representative of the time that instructors typically spend in preparing CDE teams. Regardless of differences with other studies, in the short six week period, there was still an increase in the content knowledge and argumentation skill of students. If the study was conducted for a longer period of time, there may have been larger gains in content knowledge and argumentation skill.

The results of this study indicated an overall increase in student content knowledge and argumentation skill regardless of treatment. This suggests that argumentation does not need to be infused into agricultural sales training modules in order to see growth in content knowledge and argumentation skill. This outcome may lead to further investigation to find if argumentation skill development is naturally embedded. Since it is not necessary for agriculture teachers to infuse argumentation in agricultural sales for students to learn, the teacher can save planning time by not preparing to specifically teach argumentation. Furthermore, students have the opportunity to

develop a valuable skill without specific instruction as to how to construct arguments. However, it is important to note that although gains in argumentation skill were seen, scores were still somewhat low. This could be indicative of the length of time in which this study was conducted. Other researchers (Kuhn & Udell, 2003; Thoron 2010) investigating argumentation skill over a longer period of time and found significant increases in argumentation skill. Based on the findings of other researchers and the results of this study, the length of time in which this study was conducted may not have been long enough to see significant increases in argumentation.

This particular Career Development Event was selected for use in this study for a number of reasons, mainly the potential for the development of argumentation and the potential for the development of various career skills from participation. However, further information indicated that there was discussion by the state FFA association to remove this CDE from the list of state sponsored CDEs, making this an event that was no longer available for students. This suggestion was made based upon the level of participation over the past five years. In this time frame, there was an average of ten teams competing in the CDE each year. The participation in the agricultural sales practicum was similar to that seen at the state CDE each year. However, those who participated in the practicum were mainly teachers who had never participated in the CDE previously. Therefore, participation is expected to increase at the state CDE this year, after the completion of this study. Additionally, the development of these training materials will provide agriculture teachers with guidelines for preparing an agricultural sales team.

The development of these training modules and students' participation in this practicum will aid in developing high school graduates who are prepared to enter the workforce. Much discussion has highlighted the lack of employability skills possessed by students, sometimes faulting public education for students' lack of preparation. The results of this study highlighted the development of knowledge, critical thinking skills, argumentation skill, and potentially other higher order thinking skills which will allow students to be successful in the workplace. Additionally, the components of this practicum challenge students to develop effective communication and teamwork skills. Some (Bancino & Zevalkink, 2007; Dailey, Conroy, & Shelley-Tolbert, 2001) have suggested that Career and Technical Education and even specifically agricultural education be the vehicle for helping students develop employability skills. This study has illustrated the work of Career and Technical Education in preparing students for successful careers in the respective industries.

Recommendations

Four recommendations were made for agricultural educators:
1. Agriculture teachers should consider participation in Career Development Events that not only prepare students for a specific career but also develop other transferable skills.
2. Argumentation would not need to be purposefully infused into preparation materials for agricultural sales. However, argumentation can be discussed as a method for approaching the components of the agricultural sales CDE.
3. Although further research would be necessary, instructors can include instruction on argumentation with other Career Development Events in an effort to promote the development of higher order thinking skills.
4. Agriculture teachers should spend at least six weeks (21-24 hours) preparing a CDE team.

Two recommendations were made for state FFA CDE coordinators:
1. Training modules should be developed for CDEs in an effort to help agriculture teachers effectively prepare students for a CDE and to standardize participation in the CDE.
2. State Staff and/or CDE Coordinators should work with agriculture teachers in order to determine the CDEs in which training modules should be developed.

Finally, seven recommendations were developed for future research:

1. More experimental studies are needed in the area of CDE preparation in order to prove the types of skills students are development from participation in these events.
2. Replication of this study using another group of teachers is needed to support the results found in this study (due to the low number of participants).
3. The timeframe in which this study was conducted should to be evaluated in future studies to confirm that six weeks is long enough to effectively deliver the treatment.
4. Future investigators should develop a timeline for communication with teachers before beginning the study and share this timeline with participants in order to effectively provide support for teachers participating in the study.
5. This study should be replicated to investigate the effects of these treatments on long-term retention of content knowledge achievement and argumentation skill.
6. Further research should be conducted to determine student attitudes toward training modules.
7. Further research should be conducted to determine teachers' perceptions of participation in the study. Additionally, future studies should evaluate teachers' perceptions following the conclusion of the study.

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