TOTAL PROGRAM EFFICACY: A COMPARISON OF TRADITIONALLY AND ALTERNATIVELY CERTIFIED AGRICULTURE TEACHERS

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Abstract

The purpose of this study was to determine agriculture teachers' perceived levels of efficacy as they relate to managing the total program of agricultural education, both for traditionally and alternatively certified teachers. The constructs used in this study were technical content, FFA/leadership development/SAE, teaching and learning, and program management. Respondents consisted of 136 traditionally certified teachers and 76 alternatively certified teachers at either the middle and/or high school level. Traditionally certified teachers were predominately male (81%); alternatively certified teachers were 63% male. Traditionally certified teachers had either earned a bachelor's and/or master's degree, alternatively certified teachers indicated having obtained a least a master's degree. Ninety-six percent of traditionally certified teachers have an advisory committee versus 88% of alternatively certified teachers. Traditionally certified teachers were most efficacious in their program management abilities and least efficacious in the technical agriculture content knowledge. Alternatively certified agriculture teachers were most efficacious in their pedagogical strategies and least efficacious in their technical agriculture content knowledge. Technical content was the lowest teacher efficacy variable for both groups. Traditionally certified agriculture teachers exhibit more self-efficacy than alternatively certified teachers in technical content knowledge, in conducting FFA, leadership development, and SAE activities, and in managing the total program.

Introduction

The pedagogical means of educating students in agricultural programs has radically changed during the last century. With this change in agricultural education comes the need to continually identify whether agriculture teachers are truly meeting the needs of their clientele (students). One may argue that if teachers are meeting the needs of their students, they are effective educators, well versed in program management pedagogical techniques for all phases of the total program of agricultural education.

There is more to teaching agriculture than content and pedagogical process. According to espoused theories of other agricultural education researchers (Edwards & Briers, 1999; Garton & Chung, 1996; Greiman, Walker, & Birkenholz, 2002; Joerger, 2002; Layfield & Dobbins, 2002; Mundt & Connors, 1999; Peiter, Terry, & Cartmell, 2003; and Roberts & Dyer, 2002), teaching competency need areas may include (a) planning and managing the FFA program, (b) preparing students for participation in leadership and career development events (CDEs), (c) preparing FFA degree applications, (d) preparing proficiency awards, (e) completing other reports, (f) developing an effective public relations program, (g) managing an advisory committee, (h) managing an adult program, (i) developing and updating curricula, (j) organizing fundraising activities, (k) managing students' SAEs, and (l) building support for the agricultural education program.

Results of a Delphi study conducted by Roberts and Dyer (2003) that identified characteristics of effective teachers indicate that participants were in 100% agreement on the following characteristics: care for

students; effectively plan for instruction; effectively evaluate student achievement; be honest, moral, and ethical; have sound knowledge of the FFA and effectively prepare students for CDEs and other FFA activities; communicate well with others; and effectively manage, maintain, and improve laboratories.

Not only does the agricultural education profession in the United States need competent, effective teachers, it continues to face an annual shortage of qualified teachers (Camp, Broyles, & Skelton, 2001). According to Camp et al., there has been an annual shortage of teachers for more than 37 years in the United States. This teacher shortage is not unique to agriscience education. As evidenced by state departments of education across the country, there has been an increase in the number of states that have developed alternative certification programs to help remedy teacher shortages. According to an Executive Summary published by the National Center for Education Information (NCEI) in 2003, there were 46 states and the District of Columbia that had some type of alternative route for certifying secondary teachers. In 1983, there were only eight states that offered an alternative certification option (NCEI).

According to Wise (as cited in Hoepfl, 2001), alternative certification is a process in which a state licenses a person who has not completed a post-secondary teacher education program. The NCEI identifies the following characteristics of alternative routes to certification: have at least a bachelor's degree; pass a screening process that may include tests; begin full-time teaching (on-the-job training); complete coursework; work with mentor teachers; and meet high performance standards.

With this shortage of teachers and the need to be versed in the latest technology and pedagogical techniques, are alternatively certified teachers as successful and capable as those who were trained in a traditional program of teacher education? Previous research has provided mixed results when studying teachers' perceived competence or efficacy in fields of education; and agricultural education research and results are limited (Rocca & Washburn, 2005).

Wenglinsky (2002) looked at math and science achievement of over 7,100 8th graders as related to measures of teaching quality and teacher characteristics. He found that student achievement was influenced by both teacher content background (major or minor in math education) and professional development coursework. Furthermore, students performed better when teachers provided hands-on learning and focused on higher-order thinking skills.

Goldhaber and Brewer (as cited by Darling-Hammond & Sykes, 2003) found students whose teachers had bachelor's degrees in mathematics or science achieved at higher levels on math and science examinations than their peers who had teachers with bachelor's degrees in nonmathematical and non-science subjects. Darling-Hammond and Sykes argued that many characteristics, those beyond subject matter knowledge, are important for good teaching. Examples include enthusiasm, flexibility, perseverance, and concern for students.

In a study of 240 technology education teachers from 10 southeastern states, Wash, Lovedahl, and Paige (2000) found insufficient evidence to conclude that there was a difference in participation in professional development activities (participate in curriculum development, membership in state professional association, completion of graduate coursework, etc.) between traditionally and alternatively certified teachers. Furthermore, Wash et al. found no difference in the receptivity to change between traditionally and alternatively certified technology education teachers.

As previously stated, there is limited research data in agricultural education that either supports or refutes the argument that traditionally certified teachers are more effective than alternatively certified agriculture teachers. A study conducted by Knobloch and Whittington (2002) found novice agriculture teachers who had teaching and apprentice teaching experience were more confident than teachers with less experience. Rocca and Washburn (2005) compared traditionally and alternatively

certified agriculture teachers' perceptions of self-efficacy as it relates to teaching and found non-distinguishable results between the two groups.

Theoretical Framework

To date, agricultural education researchers have only reported on teacher efficacy related to general pedagogical topics such as student engagement, instructional methods, and classroom management. According to Pajares (1996), self-efficacy is primarily a domain-specific construct. This study by Pajares was conducted to determine not only agriculture teachers' perceived competence or efficacy in teaching and learning, but also in areas such as program management, FFA, SAE, and leadership development in a southern state.

The theoretical framework for this study was based on Bandura's (1977) self-efficacy theory. Bandura purports that self-efficacy refers to personal beliefs about one's capabilities to perform actions, such as teaching, at specific levels. According to Tschannen-Moran, Woolfolk Hoy, & Hoy (1998), self-efficacy is important because efficacious teachers are more willing to try new things (Smylie, 1988), prone to less stress (Parkay, Greenwood, Olejnik, & Proller, 1988), and more likely to stay in the teaching field (Glickman & Tamashiro, 1982). Perhaps even more importantly, efficacious teachers have more successful students (Ashton & Webb, 1986). According to Tschannen-Moran et al., "teachers with a high level of efficacy believed that they could control, or at least strongly influence, student achievement and motivation" (p. 2).

Purpose and Objectives

The purpose of this study was to determine agriculture teachers' perceived levels of efficacy as it relates to managing the total program of agricultural education, for traditionally and alternatively certified teachers. More specifically, the following objectives guided this study:

1. Describe selected characteristics of traditionally and alternatively certified teachers and their agriculture education programs; and
2. Compare traditionally and alternatively certified teachers' perceived level of efficacy for competencies related to technical agriculture content, FFA/leadership development/SAE, teaching and learning in agricultural education, and managing the total program of agricultural education.

Procedures

The population of this descriptive census study included the 348 middle school and/or high school agriculture teachers employed during the 2004-2005 school year in Georgia. Surveys were distributed and collected at the state vocational agriculture teachers' conference, regional agriculture teacher meetings, and via an online version of the instrument.

A modified version of the Borich needs assessment model (Borich, 1980) was used to determine the teachers' perceived level of efficacy for the following variables: technical agriculture content, FFA/leadership development/SAE, teaching and learning, and program management. The technical content construct comprised of 24 items; sample items included using computers in classroom teaching, teaching skills and concepts in the plant sciences, teaching skills and concepts in biotechnology, and teaching agriscience. The FFA/leadership development/SAE construct consisted of 18 items; sample items included supervising student SAEs, teaching record keeping skills, preparing FFA degree and proficiency applications, and organizing fundraising activities. The teaching and learning construct had 12 items; sample items included managing student behavior problems, teaching students problem solving skills, motivating students to learn, and assessing and evaluating student performance. The program management construct consisted of

nine items; sample items included completing reports for local and state administrators, establishing a program advisory committee, evaluating the local agriculture program, and determining course content (Table 1).

Table 1
Abbreviated Items Comprising Each Agriculture Teacher Self-efficacy Construct

Technical Agriculture Content	FFA/Leadership Development/SAE	Teaching and Learning	Program Management
Computers	Preparing CDE teams	Field trips	Completing reports
Multimedia equipment	Developing SAEs	Teaching labs	Program needs assessments
Agribusiness skills	Supervising SAEs	Adult program	Locating and selecting student references and materials
Plant biotechnology	Developing PR programs	Teaching with experiments	Determining course content
Small engines	Record keeping	Teaching problem-solving	Evaluating the agriculture program
Plant sciences	Coordinating activities with local agricultural organizations	Working with learning disabled students	Developing relationships
Marketing	FFA chapter activities	Conducting parent/teacher conferences	Advisory committee
Agriscience	Teaching public issues related to agriculture	Developing performance based assessments	Using the advisory committee to acquire resources
Soils	Utilizing Alumni	Evaluating student performance	Embedding standards into the curriculum
Animal Science	FFA fundraising	Managing behavior	
Equine Science	Banquets	Motivating students	
Environment	FFA degree applications	Teaching students to think critically and creatively	
Construction	FFA proficiency award applications		
Forestry	Guiding students interested in post-secondary education		
Electricity	Career exploration activities		
Welding	Coops/Internships		
Animal biotechnology	School to Work		
Crop production	Integrating life skills into curriculum		
Landscaping			

The items within each of the aforementioned constructs were developed using a Likert-type scale ranging from 1 to 5 (1 = not competent, 5 = very competent). A panel of experts consisting of four university faculty, two graduate students, three regional coordinators of agricultural education, and four agriculture teachers was used to determine the face and content validity of the instrument. Cronbach's alpha was calculated to determine the reliability of each construct. Cronbach's alpha for technical agriculture content, FFA/leadership development/SAE, teaching and learning, and program management was 0.87, 0.92, 0.87, 0.91, and 0.90 respectively.

The data collected were entered into SPSS v. 12.0. Mean and standard deviation were calculated for each of the constructs for both traditionally and alternatively certified teachers to determine their perceived level of efficacy. Independent samples t-tests were calculated for each construct to compare mean scores for teaching efficacy. Cohen's d was chosen as the most appropriate effect size calculation to complement the independent samples *t*-test (Cohen, 1977).

There were 212 respondents out of 348 middle school and/or high school agriculture teachers in the population, yielding a response rate of 61%. Demographic data and anecdotal evidence confirmed that this sample was representative of the population. Therefore, the researcher's position is congruent with that of Gall, Gall, and Borg (2003, p. 176), who asserted that "inferential statistics can be used with data … if the sample is carefully conceptualized to represent a particular population."

Lindner, Murphy, and Briers (2001) and Miller and Smith (1983) reported that responses of late respondents are often similar to nonrespondents and reasoned that if there is not a difference between early respondents and late respondents, there is little need to pursue additional efforts to increase responses from nonrespondents. To address nonresponse, early respondents—those who completed the instrument at the annual state vocational agriculture teachers' conference (n = 121) were compared with late respondents—those who completed the instrument at regional agriculture teacher meetings or via an online version (n = 91) based on the variables of interest (technical agriculture content, FFA/leadership development/SAE, teaching and learning, and program management) using an independent samples *t*-test. No significant differences were found between early and late respondents.

Findings

Objective 1: *Descriptive Characteristics of Traditionally and Alternatively Certified Agriculture Teachers and Their Agricultural Education Programs*

Respondents consisted of 136 traditionally certified teachers and 76 alternatively certified teachers (either middle and/or high school level). Traditionally certified teachers were predominately male (81%); alternatively certified teachers were 63% male. Both traditionally and alternatively certified teachers indicated being married, 77% and 78%, respectively. Traditionally certified teachers had either earned a bachelor's and/or master's degree, whereas the alternatively certified teachers indicated having obtained a least a master's degree. Ninety-six percent of traditionally certified teachers have an advisory committee versus 88% of alternatively certified teachers.

Objective 2: Compare Traditionally and Alternatively Certified Teachers' Perceived Level of Efficacy for Competencies Related to Technical Agriculture Content, FFA/Leadership Development/ SAE, Teaching and Learning, and Managing the Total Program of Agricultural Education

As indicated in Table 2, both groups of teachers perceived themselves as somewhat competent for the technical content construct, and competent for the other constructs. The lowest construct mean score for both groups was technical content. The highest construct mean score for traditionally certified teachers was for program management; the highest construct mean score for alternatively certified teachers was teaching and learning.

Table 2
Construct Means for Alternatively and Traditionally Certified Teachers

	Traditionally Certified			Alternatively Certified		
	N	*M*	*SD*	*N*	*M*	*SD*
Technical Content	135	3.38	0.46	76	3.21	0.53
FFA/Leadership Development/SAE	135	3.70	0.51	76	3.51	0.63
Teaching and Learning	135	3.78	0.52	76	3.65	0.63
Program Management	135	3.83	0.56	76	3.57	0.77

Note. Not Competent (M = 1.0-1.49), Little Competent (M = 1.5-2.49), Somewhat Competent (M = 2.5-3.49), Competent (M = 3.5-4.49), and Very Competent (M = 4.5-5.0).

Traditionally certified (M = 3.38, SD = 0.46) teachers were significantly more efficacious than alternatively certified (M = 3.21, SD = 0.53) teachers in terms of their technical content knowledge, $t(209) = -2.35$, $p < 0.05$, Cohen's $d = 0.40$. Traditionally certified (M = 3.70, SD = 0.51) teachers were also significantly more efficacious than alternatively certified (M = 3.51, SD = 0.63) teachers in conducting activities related to FFA, leadership development, and SAE, $t(209) = -2.41$, $p < 0.05$, Cohen's $d = 0.37$. Furthermore, traditionally certified (M = 3.83, SD = 0.56) teachers were significantly more efficacious than alternatively certified (M = 3.57, SD = 0.77) teachers in program management, $t(209) = -2.77$, $p < 0.05$, Cohen's $d = 0.46$. There was no significant difference between the two groups' teaching and learning efficacy, $t(209) = -1.59$, $p > 0.05$, Cohen's $d = 0.25$ (Table 3).

Table 3
Independent Samples Test Comparing Mean Scores for Teaching Efficacy Constructs

	T	df	Sig. (2-tailed)	Cohen's *d*
Technical Content	-2.35	209	.020	0.40
FFA/Leadership Development/SAE	-2.41	209	.017	0.37
Teaching and Learning	-1.59	209	.113	0.25
Program Management	-2.77	209	.006	0.46

Conclusions

Traditionally certified teachers in this study were predominately male (81%), married (77%), had earned either a bachelor's or master's degree, and indicated having an advisory committee (96%) as part of their program. Alternatively certified teachers were male (63%), married (78%), were more likely to have a master's degree, and less likely to have an advisory committee (88%) in their program than traditionally certified teachers. Approximately half of traditionally certified (52%) and alternatively certified (55%) teachers conducted adult education in their programs. Of the 212 respondents, 36% were alternatively certified to teach agriculture. This percentage is higher than the national average of 13% as reported by Camp et al. (2001) but is lower in comparison to findings by Roberts and Dyer (2003), who reported that approximately half of Florida's agriculture teachers were alternatively certified.

Traditionally certified agriculture teachers were most efficacious in their program management abilities and least efficacious in the technical agriculture content knowledge. Alternatively certified agriculture teachers were most efficacious in their pedagogical strategies and least

efficacious in their technical agriculture content knowledge. Technical content was the lowest teacher efficacy variable for both groups. Traditionally certified agriculture teachers exhibit more self-efficacy than alternatively certified teachers in technical content knowledge, in conducting FFA, leadership development, and SAE activities, and in managing the agricultural education program.

Discussion/Implications

The level of self-efficacy of traditionally certified teachers versus alternatively certified teachers for the aforementioned constructs can be explained by the theories espoused by Bandura (1977) and Tschannen-Moran et al. (1998)—multiple learning experiences can shape an individual's perceptions of self-efficacy. Traditionally certified teachers typically gain more experiences related to the management of the total program of agricultural education through teacher education courses, early field-based experiences, and student teaching programs. One may argue that traditionally certified teachers have been exposed to more pedagogical and learning theories and experiences than alternatively certified teachers that will increase their self-efficacy as it relates to the items within the program management construct (i.e., locating and selecting student resources, determining course content, embedding standards into the curriculum, and evaluating the agriculture program). The results of this study are contradictory to Rocca and Washburn (2005) who found no noticeable differences in teacher efficacy between traditionally and alternatively certified agriculture teachers. They did find, however, a difference in the variance of summated scores with alternatively certified teachers having the greater variability.

Recommendations

The researchers have made the following recommendations based on the findings of this study:

Provide professional development opportunities for both groups of teachers at state sponsored meetings and workshops.

Identify via annual inservice questionnaires specific technical content areas for which each group needs professional development.

Provide additional opportunities for alternatively certified teachers at teachers' conferences and/or other venues to improve their knowledge, skills, and abilities in activities related to the FFA, leadership development, and program management.

Revisit alternative certification exams, courses, and procedures to ensure that alternatively certified teachers are better able to develop their content knowledge, confidence in conducting activities related to FFA, leadership development and SAE, and their program management prowess.

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