Journal of Agricultural Education
Volume 51, Number1, pp. 22 – 31
DOI: 10.5032/jae.2010.01022

A Comparison of First and Fifth Year Agriculture Teachers on Personal Teaching Efficacy, General Teaching Efficacy and Content Efficacy

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The purpose of this study was to compare first and fifth year agriculture teachers' on general teaching efficacy, personal teaching efficacy, and content efficacy. Teacher efficacy has been defined as a two dimensional construct composed of personal teaching and general teaching efficacy. Personal teaching efficacy involves a teacher's evaluation of their own capability to bring about student learning. General teaching efficacy reflects the degree a teacher believes other educators can control the learning environment despite influences such as family background, intelligence quotient (IQ) and school conditions (Gibson & Dembo, 1984). Content efficacy is the level of confidence an agriculture teacher possesses in agribusiness and economics, plant and soil science, animal science, agricultural mechanics and technology, and natural resources and environmental science. The sample consisted of first and fifth year agriculture teachers in Texas during the 2006–07 school year. A total of 129 first year teachers and 68 fifth year teachers were identified and 141 teachers responded yielding a 71% response rate. Personal teaching and general teaching efficacy were measured by the short form of the teacher efficacy scale (Woolfolk & Hoy, 1990). A researcher developed instrument was used to measure content efficacy.

Introduction

According to the National Research Agenda for Agricultural Education and Communication, research priority area four for agricultural education in schools is to, "prepare and provide an abundance of fully qualified and highly motivated agriscience educators at all levels" (Osborne, n.d., p. 20). The agenda specifically calls for efforts to, "identify and analyze variables that contribute to teacher success" (p. 20). This study contributes to the work of the National Research Agenda by investigating teacher efficacy during a critical period in teacher development. Teacher efficacy is an essential characteristic of qualified and highly motivated agriscience teachers because as teacher efficacy increases the amount of effort applied by teachers increases as well.

Defining Efficacy

Researchers have agreed teaching efficacy is complex and difficult to understand (Knobloch, 2001; Tschannen–Moran, 2000). Bandura (1997) first defined self efficacy as a belief in one's capability to execute the actions necessary to achieve a certain level of performance. Gibson and Dembo (1984) defined teacher efficacy as a multi–dimensional construct composed of two independent dimensions: personal teaching efficacy and general teaching efficacy. Personal teaching efficacy involves a teachers' evaluation of their own capability to bring about student learning. General teaching efficacy reflects the degree to which a teacher believes educators can control the learning environment despite influences such as family background, IQ and school conditions.

Self efficacy, as described by the personal and general efficacy sub–scales, fails to

recognize the contribution of content efficacy to overall teacher efficacy. Knowledge in subject matter has been found to be an important characteristic of effective teachers (Roberts & Dyer, 2004). Therefore, it is important to incorporate content efficacy into any investigation of teacher efficacy. Complicating the issue of subject matter knowledge within agricultural education is the fact agriculture teachers teach a variety of subjects. Those subjects could range from plant and soil science to agricultural mechanics and beyond. Prior research has investigated perceptions of content specific knowledge to determine teachers' in–service needs. However, little work has been done to determine the role subject matter knowledge plays in teacher efficacy.

Bandura (1977) suggested efficacy is strongly influenced by experience. Much of the research on teacher efficacy has been focused either in pre–service teaching and the student teaching experience or teaching experience across the entire career cycle. Little research has been done, particularly in agricultural education, to explore differences in or changes in teaching efficacy during the early years of in–service teaching.

Determining Appropriate Stages

Huberman (1989) proposed The Teacher Career Cycle Model, describing different career stages encountered by teachers throughout their careers. The model includes the influence of personal or organizational environmental conditions upon the career development of the teacher. The initial phase of the model is described as the discovery and survival phase, which lasts from one to three years. Individuals in this stage focus upon learning how to teach, deciding what to teach, navigating through the teaching environment, learning how to manage students and self, and developing an overall sense of efficacy. Between years four and six of teaching, career teachers enter into the second phase, stabilization. In this phase teachers commit to teaching and are less inclined to focus on other occupational ambitions. Teachers in this stage typically believe they possess greater pedagogical mastery and focus upon the educational needs of students.

Previous studies have found teacher efficacy to be stable throughout various career stages in teaching. However, these researchers have typically grouped large intervals of teaching experience together. Pigge and Marso (1993) defined early career teachers as teachers with 5 to 19 years of experience. Teachers in the middle of their career were defined as teachers with 20 to 29 year of teaching experience. Teachers late in their career were those who had 30 or more years of teaching experience. DeMesquitat and Drake (1994) broke teachers up into four groups. Group one had 1 to 8 years teaching experience. Group two had 9 to 14 years of teaching experience. Group three consisted of teachers with 15 to 18 years of teaching experience. Group four had teachers with 19 to 37 years of teaching experience. Broad groupings fail to detect differences among teachers in Huberman's survival phase and stabilization phase. These are critical phases for the retention of teachers. As many as 15% of new teachers leave the profession during the first or second year (Darling–Hammond, 1997), and as many as half of all teachers reportedly leave by the end of their sixth year (Marso & Pigge, 1997). Fifth year teachers are included in Pigge and Marso (1993) in the early career teachers versus a new teacher. Also, by comparing fifth year teachers, the intent is to capture those teachers that have transitioned into Huberman's stabilization phase. In addition, if the sixth year is a heavy discontinuance year as proposed by Darling–Hammond (1997), it is important the evaluate efficacy as teachers enter this point in their career.

There has been developing interest in investigating teacher efficacy at the pre–service and student teaching phase. Watters and Ginns (1995) found that general teaching efficacy beliefs are most likely to change when students are exposed to vicarious learning experiences or social persuasion, such as coursework. According to Woolfolk and Hoy (1990), actual teaching experiences during the student teaching practicum have a great impact on personal teaching efficacy and general teaching efficacy. Hoy, Tarter, and Kottkamp (2000) found that efficacy rose during teacher preparation, but decreased with actual teaching experiences. Roberts, Harlin, and Ricketts (2006) found teaching efficacy levels of student teachers increased during the 4–week classroom instruction, decreased to their lowest levels in the middle of the 11–week field experiences, and then increased to their highest levels at the

end of the 11–week field experiences. Knobloch (2006) found student agriculture teachers entered their student teaching experiences already feeling efficacious, and their sense of efficacy did not change at the end of the student teaching experience. Knobloch (2001) recommended more research on the development of teaching efficacy, specifically during the "beginning years" (p 128) of teaching. Knobloch's call for further research during the beginning of a teacher's career strongly supported the use of fifth year teachers for comparison in this study (2001).

The consequences of teacher efficacy are that greater efficacy leads to greater effort and persistence, which lead to better performance (Tschannen–Moran, Woolfolk Hoy, & Hoy, 1998). Teacher performance, influenced by the performer's sense of efficacy, becomes the source of future efficacy beliefs. Over time this process stabilizes into an enduring set of efficacy beliefs. This raises the question of whether there is a difference in the level of personal teaching, general teaching and content efficacies due to teaching experience.

Purpose and Objectives

The purpose of this study was to compare first and fifth year agriculture teachers' on general teaching efficacy, personal teaching efficacy, and content efficacy. The objectives of this study were as follows:

1. Describe the demographic characteristics of first and fifth year Texas agriculture teachers.
2. Compare personal teaching efficacy and general teaching efficacy of first year and fifth year teachers.
3. Compare content efficacy of first year and fifth year teachers.

Methods

The population of this study was first and fifth year agriculture teachers in Texas. The accessible sample was first and fifth year agriculture teachers during the 2006 – 2007 school year. First year and fifth year agriculture teachers were selected because of their differences according to the Teacher Career Cycle Model (Huberman, 1989). Knobloch (2001) found that teacher efficacy was not significantly impacted by stage of development. However, that study compared the efficacy level of first, second, and third year teachers. According to Huberman, first year teachers are in the survival phase while fifth year teachers are in the stabilization phase. These principles contributed to the choice of studying first and five year teachers. Findings from this study represent an accepting sample. Caution should be used in generalizing the findings beyond the sample studied.

A frame was developed for first and fifth year Texas agriculture teachers from the 2006–2007 membership list of the Vocational Agricultural Teachers Association of Texas. This list was thoroughly analyzed. Duplicate entries and entries that did not apply to the study were deleted and other known first year and fifth year teachers were added. Entries that did not apply were those teachers that had left the field or were not a first year or fifth year teacher. The target population was identified as 197 individuals, consisting of 129 first year teachers and 68 fifth year teachers.

Data were collected using an electronic questionnaire. The instrument consisted of three sections. Section 1 measured general teaching efficacy and personal teaching efficacy, section 2 measured content efficacy and section 3 measured demographic characteristics. For tracking purposes, participants were randomly given a three digit code. The first question on the instrument was a mandatory open–ended question asking for the individual's unique code that was provided in each email correspondence.

General teaching efficacy and personal teaching efficacy were measured using a modified version of the Teacher Efficacy Scale (Gibson & Dembo, 1984) that was used by Woolfolk and Hoy in 1990. Woolfolk and Hoy modified the original scale by only using the 16 questions that produced an adequate reliability and four more items that referred to the adequacy of the teacher's pre–service program. Participants were asked to rate their level of agreement on 20 five–point Likert–type scale items, 1 being strongly disagree and 5being strongly agree. This instrument contained seven items that measured general teaching efficacy and nine items that measured personal teaching efficacy. The alpha coefficients of reliability were previously reported as 0.77 for the personal

teaching efficacy and 0.72 for general teaching efficacy. Post hoc reliability analysis resulted in similar reliability coefficients for first year teachers (personal teaching α = 0.74, general teaching α = 0.67) and fifth year teachers (personal teaching α = 0.71, general teaching α = 0.75).

Section 2 of the instrument contained 14 researcher developed items. These 14 items were five–point Likert–type scale items used to measure technical content knowledge. The Texas certification exam in agriculture content is comprised of five domains. Each domain represents a subject area and contains technical competencies for that domain. For each of the 14 items, teachers were asked to rate their confidence in the ability to teach the technical competencies for each of the five domains in the Texas certification exam framework. Participants rated their ability on a five point scale with 1 being not confident and 5 being complete confidence. Items were developed using the Texas Education Agency Preparation Manual—Agricultural Science and Technology 6–12 (Texas Education Agency (TEA), 2006).

Content domains measured were: agribusiness and economics; plant and soil science; animal science; agricultural mechanics and technology; and natural recourses and environmental science. The certification exam and the competencies listed were designed by a committee of state center staff, representatives from professional educator organizations, content experts, and members of the business community (Texas Education Agency, 2006). Therefore, the items used in this section of the survey were validated by the panel of teacher educators and experts in the agriculture field responsible for creating the exam. This section of the instrument was pilot tested using the 17 spring 2007, student agriculture teachers at Texas Tech University on May 7, 2007. The pilot test yielded a Cronbach's alpha of 0.85. After data collection, the content efficacy reliability was determined to be 0.93 for first year teachers and 0.87 for fifth year teachers.

The final section of the instrument collected demographic data to describe the participants in the study. The items included age, gender, ethnicity, level of education and certification method.

Subjects were contacted via email. Participants who could not be contacted electronically were sent a letter containing an invitation to participate and the link to the survey. Data collection was conducted May 15th through June 22nd. A total of five contacts with each participant were made. The contacts included the initial invitation to participate, three thank you and follow up reminders, and a final notice. This produced 141 useable instruments for an overall response rate of 71%; 71% (n = 92) of first year teachers and 72% (n = 49) of fifth year teachers.

To control for non–response, a comparison was made between early respondents and late respondents. Typically, individuals who responded to the last stimulus would be called late respondents. Linder, Murphy, and Briers (2001) recommend to "back up" (p. 52). This consists of using responses from multiple stimuli until a minimum of 30 late respondents is reached. To accomplish this goal, respondents who completed the instrument prior to May 30th were considered early respondents, while those who completed the instrument on or after May 30th were considered late respondents. An independent samples t–test showed no significant difference among early and late respondents for first year teachers. Fifth year teachers also showed no significant difference between early and late respondents on personal, general, and content efficacy.

Data were analyzed using SPSS. Measures of central tendency and variability were used to describe teacher characteristics. Cohen's d, a measure of effect size, was calculated to analyze the difference between first year teachers and fifth year teachers on the dependent variables. According to Fraenkel and Wallen (2003) effect size is a "technique for assessing the magnitude of a difference between the means of two groups" (p. 257).

Findings

The first objective sought to describe the demographic characteristics of first and fifth year agriculture teachers. Age was the first characteristic of interest in the study. The average age of first year teachers (n = 83) was 28 (SD = 7.35) and ranged from 21 to 56. First year teachers had a median age of 25. Fifth year teachers (n = 45) had a mean age of 32 (SD = 6.65) and ranged from 26 to 52. The median age of fifth year teachers was 30.

A summary of the remaining teacher characteristics is displayed in Table 1. Males (51%) and females (49%) were equally represented among first year teachers while fifth year teacher were represented by a majority of males (63%).

Table 1
Summary of Demographic Characteristics for First and Fifth Year Teachers

	1st Year Teachers (n = 84)		5th Year Teachers (n = 46)	
	f	%	*f*	%
Gender				
Male	43	51.2	29	63.0
Female	41	48.8	17	37.0
Ethnicity				
Caucasian	74	90.2	42	93.3
Hispanic	6	7.3	2	4.4
Black	1	1.2	1	2.2
Other	1	1.2	0	0.0
Education				
Bachelor's Degree	66	78.6	29	63.0
Master's Degree	18	21.4	17	37.0
Certification				
Traditional	56	66.7	32	69.6
Post–baccalaureate	12	14.3	5	10.9
Emergency	10	11.9	6	13.0
Masters	6	7.1	3	6.5

With regard to ethnicity, both experience groups were found to have a strong majority of Caucasian teachers. However, first year teachers had a slightly higher percent of Hispanic teachers (7.3%) as compared to fifth year teachers (4.3%). A bachelor's degree was the highest level of education reported for the majority for first (78.6%) and fifth year teachers (63.0%). Traditionally certified teachers made up 66.7% of first year teachers and 69.6% of fifth year teachers.

Objective 2 sought to compare personal teaching efficacy and general teaching efficacy of first year and fifth year teachers (see Table 2). The mean score for personal teaching efficacy of first year teachers was 3.60 (*SD* = 0.62). General teaching efficacy was rated lower by first year teachers with a mean score of 3.01 (*SD* = 0.67). Consistent with the first year teachers, the fifth year teachers rated personal teaching efficacy higher than general teaching efficacy. However, the fifth year group had higher mean scores on both personal teaching efficacy (*M* = 3.70) and general teaching efficacy (*M* = 3.08). Effect sizes were calculated to assess the magnitude of the difference between the two groups. The value of Cohen's *d* for personal teaching efficacy was 0.18 and for general teaching efficacy was 0.10. In both cases the size of the effect is considered small (Field, 2005).

Table 2
A Comparison of First Year and Fifth Year Teachers on Personal Teaching Efficacy and General Teaching Efficacy

	1st Year Teachers (n = 84)		5th Year Teachers (n = 46)			
Characteristic	*M*	*SD*	*M*	*SD*	Effect Size	Cohen's Index
Personal Teaching Efficacy	3.60	0.62	3.70	0.45	0.18	Small
General Teaching Efficacy	3.01	0.67	3.08	0.67	0.10	Small

Note. Items were rated on a Likert–type scale of 1 to 5, with 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.

The third objective sought to compare content efficacy of first year and fifth year teachers (see Table 3). The mean for first year teachers on overall content efficacy was 3.74 (*SD* = 0.67). Additionally, content efficacy was broken down into five technical domains. First year teachers were most confident in animal science (*M* = 4.24, *SD* = 0.80). Agricultural mechanics and technology (*M* = 3.48, *SD* = 0.93) was the subject first year teachers were least confident in performing.

Table 3
A Comparison of First Year and Fifth Year Teachers on Overall Content Efficacy and Content Efficacy by Domain

	1st Year Teachers (n = 84)		5th Year Teachers (n = 46)			
Characteristic	*M*	*SD*	*M*	*SD*	Effect Size	Cohen's Index
Overall Content Efficacy	3.74	0.62	3.87	0.45	0.24	Small
Animal Science	4.24	0.80	4.34	0.58	0.14	Small
Ag Business & Economics	3.70	0.79	3.84	0.56	0.20	Small
Plant & Soil Science	3.63	0.71	3.71	0.48	0.13	Small
Environmental Science	3.62	0.89	3.70	0.64	0.10	Small
Ag Mechanics & Technology	3.48	0.93	3.77	0.72	0.35	Medium

Note. Items were rated on a Likert–type scale of 1 to 5, with 1 = not confident, 2 = slightly confident, 3 = somewhat confident, 4 = confident, 5 = very confident.

The mean for overall content efficacy for fifth year teachers was 3.87 (*SD* = 0.45). Similar to first year teachers, the fifth year teachers were most confident in animal science (*M* = 4.34, *SD* = 0.58) Fifth year teachers were least confident in environmental science (*M* = 3.70, *SD* = 0.64). Effect sizes were calculated to assess the magnitude of the differences between the two groups on content domains. Cohen's *d* values ranged from 0.10 to 0.35. The effect size for agricultural mechanics technology was medium. All other effect sizes were small.

Conclusions/Recommendations/Implications

Demographics

Kantrovich (2007) reported that nationally males outnumbered females 3:1 among secondary agriculture teachers. Males also outnumbered females among the fifth year teachers in this study, although by a smaller margin. About two–thirds of the fifth year teachers were male. First year teachers, however, were more balanced in gender with 51.2% of the sample being male. This gender equity is similar to other findings of first year teachers in Texas. Burris and Keller (2007) found 53% of first year agriculture teachers in 2006 were male. These findings indicate a trend shift in gender distribution. It is apparent that agricultural education has arrived at a balance between genders. It is not clear if this equal distribution will be stable over time or if the trend will continue toward larger percentages of female teachers. The gender distribution of new teachers should be continually monitored. Another topic to research further is determining the differences between efficacy levels among genders.

Burris and Keller (2007) reported 19% of first year teachers in 2006 had earned a master's degree. This study found a higher percentage of first year teachers (27%) having a master's degree. Additionally, 37% of fifth year teachers reported having a master's degree. This discrepancy between groups could possibly reflect a higher retention of teachers with a master's degree. Likewise, the difference may reflect the outcome of continued education by those who earned their master's degree during those first five years of teaching. Further research should be done to determine the impact of different degree levels.

Camp, Broyles, and Skelton (2002) reported that 13% of agriculture teachers nationally were certified by methods other than an undergraduate degree in agricultural education. This study found a higher number of teachers being certified by some means other than a traditional undergraduate degree in agricultural education. Alternative certification methods accounted for 33% of first year teachers and 30% of fifth year teachers. This utilization of alternative certification methods may provide some additional explanation for the discrepancy in the level of education as some choose to certify post–baccalaureate.

Efficacy

The purpose of this study was to compare first and fifth year agriculture teachers on general teaching efficacy, personal teaching efficacy, and content efficacy. For both groups, personal teaching efficacy was perceived to be higher than general teaching efficacy. Teachers tended to be more confident in their own skills to bring about student learning than in the ability of teachers in general to bring about change. Fifth year teachers had a higher sense of personal teaching efficacy and general teaching efficacy than first year teachers, although the effect of experience was small. The results of this study provide further evidence that efficacy beliefs are stable even among teachers at different career stages (DeMesquitat & Drake, 1994; Pigge & Marso, 1993).

This does raise questions as to the relationship between teacher efficacy and career commitment. What role does teacher efficacy play in decisions to leave the profession? Knobloch and Whittington (2003) examined teacher efficacy related to career commitment of novice agriculture teachers. Teachers with a higher level of career commitment were more efficacious after the first 10 weeks of school and were more likely to persist in the face of difficulties they experienced during the first 10 weeks of school. Teachers in both low and high career commitment groups had the same teacher efficacy at the first week of the school year.

Therefore, it would also be valuable in the future to look at first and fifth year teachers' efficacies throughout the school year instead of just at the end of the year. Perhaps the reason the effect was small was because the first year teachers were surveyed at the end of their first year of teaching and have already reached a saturation point of the successes and failures that compose an individual's efficacy beliefs. Practitioners should continue to focus on building and maintaining efficacy beliefs during the pre–service stage. An appropriate place for this to be done is during teacher preparation programs.

Similar patterns existed in the findings of content efficacy, with fifth year teachers having a higher sense of efficacy on each of the content domains as well as overall content efficacy.

Again, effects were small with the exception of agricultural mechanics and technology (medium). The rank order of their confidence in the domains differed. First year teachers were more confident in animal science, agribusiness and economics, plant and soil sciences, environmental sciences, followed by agricultural mechanics. Fifth year teachers were more confident in animal science, agribusiness and economics, agricultural mechanics and technology, plant and soil science, followed by environmental sciences. A possible explanation for the difference in where agricultural mechanics ranked for the two groups is that teachers are more confident in that subject as their time in the agricultural mechanics lab increases. Perhaps more experience with students in the agricultural mechanics lab would be beneficial in teacher preparation programs.

Several studies have found differences among beginning and experienced teachers in–service needs; however, those studies have found that technical agricultural knowledge and skill competencies were ranked lower in priority when compared to competencies in the areas of instruction, program planning, development and evaluations, and program administration (Garton & Chung, 1997; Layfield & Dobbins, 2000). Further research in the level of efficacy in content areas should be conducted to determine what topics if any should be included for in–service training.

Possible variables in determining an individual's technical content efficacy could be the institution and technical agriculture coursework completed. The agricultural institutions in Texas have various course requirements. It is recommended that future research should consider this variable. Additionally, the number of teachers in a program may have an impact on specific content efficacy. Teachers in multi–teacher programs may have flexibility to be more focused, whereas teachers in single teacher programs may be required to exhibit competence in multiple content areas. Research should also be done on the effects of this component on teacher efficacy.

Huberman's Teacher Career Cycle Model (1989) identifies developmental stages of teachers. The model suggests that entry phase teachers develop a sense of efficacy in what he labels the discovery and survival stage, and that between years 4 and 6 teachers transition into the stabilization. The findings of this study do not support Huberman's progression of stages of development. Perhaps this is due to the fact that although efficacy is consistent, it is less important to fifth year teachers. Future research should focus on the role that efficacy plays throughout teacher career stages. Another possible explanation for the findings is teachers may not have transitioned into the stabilization phase during year 5. This suggests that there may be a need to adjust that classification based on years of teaching. Perhaps these teacher phases are different among fields. Further research should address the issues of redefining stages and comparing teacher efficacy among stages between fields of study.

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