PRESERVICE AGRICULTURAL EDUCATION TEACHERS' SENSE OF TEACHING SELF-EFFICACY

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Abstract

The purpose of this study was to perform a longitudinal examination of the teaching self-efficacy of preservice agricultural education teachers. Data were collected for two years at The University of Georgia and Texas A&M University during the Fall 2004 and Spring 2005 and the Fall 2005 and Spring 2006 semesters (N = 102). Data were collected at the following three collection points: (1) before methods class, (2) after methods course/before student teaching, and (3) after student teaching. Teacher efficacy scores in student engagement, instructional strategies, and classroom management improved at each point of data collection. Preservice teachers were the most efficacious in instructional strategies and classroom management and the least efficacious in student engagement.

Introduction

Competent teachers and the expected skills they ought to possess may be the most important factors contributing to the success of students. Confidence in one's ability to be a skillful, effective, and competent teacher is important because this confidence generally leads to fulfillment of these expectations (Bandura, 1982a). Beliefs and attitudes of preservice agricultural education teachers are the first indicators of how successful a potential teacher will be in the field of education. Teaching efficacy of the preservice teacher in agricultural education could be the key to determining the success or failure of the teacher or a university's program.

The purpose of this study was to longitudinally examine agricultural education preservice teachers' sense of self-efficacy in teaching in their final year of an agricultural education program. With an increase in agricultural education positions projected for the next decade (Camp, Broyles, & Skelton, 2002; Woglam et al., 2006), the need to assess the success or failure of developing competent, preservice agricultural education teachers is more important than ever. As teacher recruitment and retention becomes of greater concern, teaching efficacy may also become an important factor in these areas (Wheeler & Knobloch, 2006). Teaching efficacy may also explain why 19% of the qualified potential teachers sought employment in an area other than education and why 26.6% of qualified potential teachers, who wanted to teach, did not enter a teaching position (Camp et al.).

Literature Review/ Theoretical Framework

The theory bases for this study were Bandura's (1986) social cognitive theory and Bandura's (1997) self-efficacy theory. Bandura (1982b) suggested that a person's belief in accomplishing a desired outcome is influenced by a set of personal

factors and certain environmental factors. Additionally, these theories support the idea that belief in one's ability to achieve a certain task (self-efficacy) will lead to competent performance of said task.

This study focused on a more specific type of self-efficacy known as teaching efficacy. Tschannen-Moran and Woolfolk Hoy (2001) suggested that teaching efficacy affects the teacher's ability to accomplish desired outcomes. Teaching efficacy is the ability of a teacher to analyze the task related to teaching and feel competent in accomplishing that task (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Guskey and Passaro (1994) defined teaching efficacy as the belief by a teacher to affect student learning for all types of students. Teaching efficacy is an important indicator of a teacher's ability to manage a classroom, inspire students, and plan and organize effective lessons; teaching efficacy indicates the amount of time and effort a teacher will put into meeting the needs of students (Tschannen-Moran et al.). Allinder (1994) discovered that teachers with high self-efficacy in teaching put more effort and detail into planning and organization. Teachers with high teaching efficacy are also motivated and have a tendency to persevere through challenges and undesired results (Goddard, Hoy, & Hoy, 2004). Tschannen-Moran et al. stated that teaching efficacy has a cyclical nature with either a positive or negative effect.

> Greater efficacy leads to greater effort and persistence, which leads to better performance, which in turn leads to greater efficacy [and] lower efficacy leads to less effort and giving up easily, which leads to poor teaching outcomes, which then produce decreased efficacy. (p.22)

The cyclical nature of self-efficacy in teaching is also consistent with findings in agricultural education (Knobloch, 2001; Roberts, Harlin, & Ricketts, 2006). For this study, teaching efficacy is defined as the self concept of the teacher's ability to accomplish desired outcomes in student engagement, instructional strategies, and classroom management.

Preservice teaching efficacy is the highest during the preservice years but decreases during the first year of teaching and with teaching experience (Hebert, Lee, & Williamson, 1998; Soodak & Podell, 1997). Preservice teachers with higher efficacy are rated higher on teaching behaviors by their supervising teachers (Saklofske, Michaluk, & Randhawa, 1988). Tschannen-Moran et al. (1998) suggested that teaching efficacy may be improved by teacher education programs giving "preservice teachers more opportunities for actual experiences with instructing and managing children in a variety of contexts with increasing levels of complexity and challenge to provide mastery experiences and specific feedback" (p. 24). Tschannen-Moran et al. stated student teaching is a chance for preservice teachers to gather information about efficacy, and if student teaching is "experienced as a sudden, total immersion, sink-or-swim approach" that this will probably have a negative impact on teaching efficacy (p. 24).

The amount of research specifically done on teaching efficacy of preservice agricultural education teachers is limited. Knobloch (2002) compared two agricultural education programs and found that preservice teachers' teaching efficacy scores did not increase significantly over the student teaching semester**.** However, Knobloch suggested this may have been the result of the teacher-friendly environment established by supervising teachers during the experience and the beliefs of the preservice teachers that they know how to teach before student teaching. Roberts et al. (2006) found that overall teaching efficacy increases from the beginning to the end of the student teaching experience and that teaching efficacy scores increased in the constructs of student engagement, instructional strategies, and classroom management from the beginning to the end of the student teaching experience.

Student engagement should be an area of focus for all teachers (Linnenbrink & Pintrich, 2003). A problem in education is that while some students are engaged and actively participating in class or schoolwork,

others are disengaged or indifferent to learning. Newmann (1989) suggested that engagement is difficult to accomplish because it requires a certain amount of effort from each student. Newmann defined engagement as "participation, connection, attachment, and integration into particular settings and tasks" (p. 34). Newmann suggested five factors needed to promote engagement: "competence, extrinsic rewards, intrinsic interest, social support, and sense of ownership" (p. 34). According to Linnenbrink and Pintrich (2003), student motivation is related to student interests, emotional feelings, and perceptions of whether or not the information is important and meaningful. Motivation research by Pintrich and Schunk (1996) confirmed that feelings, interest, and value of a school-related task affect engagement and learning. Roberts et al. (2006) found that teaching efficacy in student engagement increased overall during the student teaching experience. Student engagement scores during the study increased at the beginning of the student teaching experience then decreased toward the middle of student teaching before increasing overall by the end of the student teaching block. This study also reported that the student teachers were the least efficacious in student engagement.

Bandura (1993) suggested that the environment of a classroom is related to a teacher's instructional efficacy. Teachers who have more instructional efficacy use more class time for instruction and provide students that have difficultly learning with the help they need (Gibson & Dembo, 1984). Also, teachers with strong instructional efficacy develop "mastery experience for their students" (Bandura, 1993, p. 140). According to Guskey (1988), teachers with higher efficacy rated mastery learning as more important than did teachers with lower efficacy. Guskey also found that mastery learning was "more congruent with their present teaching practices (r = .36) and less difficult to implement (r = -.36)" (p. 67). Woolfolk and Hoy (1990) reported that teachers' sense of personal efficacy affects their specific instructional strategies. Teachers with a low instructional efficacy rely on "extrinsic inducement and negative sanctions," and teachers with a higher instructional efficacy support a students' development of "intrinsic interest and academic self-directedness" (Bandura, 1993, p. 140). Again, according to Roberts et al. (2006), agricultural education preservice teachers increased in their self-efficacy related to instructional strategies over the entirety of the student teaching experience. Instructional strategies scores, as did the student engagement scores, during the study increased at the beginning of the student teaching experience then decreased toward the middle of student teaching before increasing overall by the end of the student teaching block. Student teachers were the most efficacious in instructional strategies.

Research regarding teaching efficacy of preservice teachers and classroom management is more prevalent. According to Henson (2001), preservice teachers' beliefs about how to manage a classroom are likely to affect how they view success upon entering education. Woolfolk and Hoy (1990, p. 88) concluded that prospective teachers with higher teaching efficacy "are more humanistic in their pupil control ideology" and that this relationship only existed with preservice teachers that had both high teaching efficacy and high personal efficacy. Witcher et al. (2002) believed that preservice teachers have only a small amount of knowledge of how external influences impact "students' behavior in the classroom" (p. 7). They also noted that preservice teachers have a self belief that they can overcome external influences that affect student achievement and that these beliefs are overestimated. With teaching experience, teachers rate external factors as having more of an impact (Hebert et al., 1998).

Henson (2001) reported that preservice teachers felt a sense of responsibility for helping instruction when it was successful, but when difficulty was encountered, preservice teachers shifted responsibility away from themselves, blaming external factors such as "home environment and poor motivation" as reasons for their difficulty or failure (p. 23).

Teachers often experience stress related to classroom discipline (Lewis, 1999), but according to Bandura (1993) a high self-efficacy reduces stress. The atmosphere of

the classroom is also affected by efficacy and "classrooms of high efficacy teachers were more relaxed and friendly and the teachers were more trusting of the students" (Woolfolk, Rosoff, & Hoy, 1990, p. 140). In a study by Baker (2005), teachers had low self-efficacy for the teaching behaviors of keeping defiant students engaged, reaching challenging students, and keeping problems from disrupting class. Baker also found that teachers had high self-efficacy for the teaching behaviors of knowing "appropriate rules for students," asking "colleagues for advise," and asking "colleagues for assistance" (p. 56). Baker further reported a significant correlation between "perceived self-efficacy for classroom management and teacher readiness for managing challenging behaviors" (p. 58). Low efficacy teachers perceived themselves significantly less able to deal with challenging behavior than teachers with high efficacy beliefs (Baker). Low efficacy teachers also were "significantly less willing to implement specialized behavior strategies" for dealing with challenging behavior, and it was found that a significant difference between high and low efficacious teachers existed (p. 59). Therefore, when a "teacher's perceived self-efficacy increases, so does that teacher's ability, willingness, and readiness for managing challenging student behaviors" (p. 59).

In agricultural education Roberts et al. (2006) found only a minor increase in teaching efficacy related to classroom management over the course of the student teaching experience. Classroom management scores during the study increased at the beginning of the student teaching experience then decreased toward the middle of student teaching before finishing at a level that was slightly above scores at the beginning of the student teaching experience.

Purpose and Objectives

The purpose of this study was to longitudinally examine teaching efficacy of preservice agricultural education teachers during the final year of an agricultural education program. The objectives that framed this study were as follows:

1. Describe the overall teaching efficacy of preservice teachers.
2. Describe the teaching efficacy of preservice teachers in student engagement, instructional strategies, and classroom management.
3. Describe the change in teaching efficacy from before the methods course to after the methods course/before student teaching and after student teaching.

Methods and Procedures

This descriptive study incorporated a one-group pretest-posttest design (Campbell & Stanley, 1963). This design is appropriate for following subjects over a period of time and for testing them at different intervals with the same instrument. The independent variable of interest was time (before teaching methods, after teaching methods/before student teaching, and after student teaching). Dependent variables included overall teaching efficacy and teaching efficacy in student engagement, instructional strategies, and classroom management.

The target population for this study was all preservice agricultural education teachers. The accessible population for this study was past, present, and future undergraduate and graduate students in their final year of the agricultural education programs at The University of Georgia and Texas A&M University. Although this was a population/census study, it was also conceptualized as a slice in time (Oliver & Hinkle, 1981) sampling of students. Convenience sampling has been justified by Gall, Borg, and Gall (1996), as long as the researcher describes in detail the sample used and the reasons for selection. Data and observations confirmed that this sample was representative.

The data represent two different years and two different groups of students. Preservice agricultural education teachers in this sample of University of Georgia (UGA) and Texas A&M University (TAMU) students consisted of 102 students, 64 females and 38 males, during Fall 2004 through Spring 2005 and Fall 2005 through 2006 semesters. The average age of the

sample was almost 24 years old (M = 23.90, SD = 5.42) with a range of 21 to 49. Most of the participants were in an age range of 21 to 27. There were nine participants that did not fall within this range. Their ages were 31, 36, 41, 42, 45, and 49 years old. Forty-three of the participants reported that they described themselves as being from a rural area, 23 reported being from a suburban area, and 3 were from an urban area. The remaining students failed to indicate where they lived. The majority of the participants were finishing an undergraduate program (n = 84, 82%). The remaining 18 students were completing a graduate program. Fifty-one participants provided their grade point average, and the mean GPA was 3.22 (SD = 0.46).

Participants volunteered to take the *Teachers' Sense of Efficacy Scale* (Tschannen-Moran & Woolfolk Hoy, 2001) by signing informed consent. The questionnaire was given to participants at the following times: (1) before methods classes in the Fall 2004 and 2005 semesters, (2) after methods course/before student teaching in the Spring 2005 and 2006 semesters, and (3) after student teaching in the Spring 2005 and 2006 semesters.

The instrument consisted of 24 items with the following three constructs: *efficacy in student engagement, efficacy in instructional strategies*, and *efficacy in classroom management* (Tschannen-Moran & Woolfolk Hoy, 2001). The instrument focused on two questions, "How much can you do…? And to what extent can you…?" These questions incorporated a summated rating scale of 1 through 9 where 1 = nothing, 3 = very little, 5 = some influence, 7 = quite a bit, and 9 = a great deal. Scores for overall efficacy and for each construct were determined by an unweighted overall mean of the appropriate items. According to Tschannen-Moran and Woolfolk Hoy, content validity was established through a panel of experts and the existing literature. Cronbach's alpha reliability for the *Teacher Sense of Efficacy Scale* (Tschannen-Moran & Woolfolk Hoy, 2001) is .94 and the reliability alphas for the constructs are as follows: student engagement .87, instructional practices .91, and classroom management .90.

Data were analyzed using both descriptive and inferential statistics. Means and standard deviations were calculated to summarize demographics, overall teaching efficacy, and specific efficacy means in student engagement, instructional strategies, and classroom management. One-way ANOVA via SPSS was used to determine whether significant changes occurred after the teaching methods course and after student teaching. Inferential statistics were deemed appropriate as Huck (2000, p. 115) purported that the "abstract population exists hypothetically as a larger mirror image" of current accessible populations and that these populations can serve as a representative sample of the larger target population. Huck further surmised that a convenience sample can be used to make inferences about future members of the target population. It should be noted that demographic data and observations were used to confirm that this sample was representative. Therefore, this research also coincides with that of Gall et al. (1996, p. 229), who stated that "inferential statistics can be used with data collected from a convenience sample if the sample is carefully conceptualized to represent a particular population."

Findings

As depicted in Table 1, overall teaching efficacy scores before the methods course averaged 6.65 (SD = .11). The lowest score was 6.56, and the highest score was 6.76. After the methods course and before student teaching, the overall teaching efficacy scores averaged 7.15 (SD = .11). The lowest score was 7.02, and the highest score was 7.17. Overall teaching efficacy scores after student teaching averaged 7.29 (SD = .16). The lowest score was 7.11, and the highest score was 7.34. The overall teaching efficacy scores increased at each data collection point and over the entire final year of the agricultural teacher education programs.

Teaching efficacy scores in student engagement, instructional strategies, and classroom management improved at each data collection point (Table 2). Preservice teachers were the most efficacious in instructional strategies and classroom

management and the least efficacious in student engagement. The overall teaching efficacy of student engagement averaged 6.89 (*SD* = 1.03). The student engagement scores at the different data collection points were as follows: prior to the methods course averaged 6.56 (*SD* = 1.03), after methods course/before student teaching averaged 7.02 (*SD* = .94), and after student teaching averaged 7.11 (*SD* = 1.03). The overall teaching efficacy of instructional practices averaged 7.09 (*SD* = 1.07). The instructional practices scores at the different data collection points were as follows: prior to the methods course averaged 6.61 (*SD* = 1.11), after methods course/before student teaching averaged 7.25 (*SD* = .94), and after student teaching averaged 7.43 (*SD* = .96). The overall teaching efficacy of classroom management averaged 7.09 (*SD* = 1.11). The classroom management scores at the different data collection points were as follows: prior to the methods course averaged 6.76 (*SD* = 1.18), after methods course/before student teaching averaged 7.17 (*SD* = 1.05), and after student teaching averaged 7.34 (*SD* = 1.04). Scores in all three constructs show a larger increase in teaching efficacy scores from pre-methods course to after methods/before student teaching than from after methods/before student teaching to after student teaching.

Table 1
Overall Teaching Efficacy Measured Over Time

Time	*M*	*SD*	*Min.*	*Max.*
Before teaching methods course	6.65	0.11	6.56	6.76
After methods course/before student teaching	7.15	0.11	7.02	7.17
After student teaching	7.29	0.16	7.11	7.34

Note. Scale: 1 = nothing, 3 = very little, 5 = some influence, 7 = quite a bit, 9 = a great deal.

The effect size was calculated according to Keppel (1991, p. 66), who stated that an omega-squared (ω^2) value of .01 represents a small effect, .06 represents a medium effect, and .15 represents a large effect. Significant difference existed for mean student engagement scores over time ($F_{(2,191)} = 5.84$, $p = .00$). The effect size for the difference was a medium effect size ($\omega^2 = .09$). Significant differences were also found in the mean instructional strategies scores over time ($F_{(2,191)} = 12.16$, $p = .00$). The effect size for this difference was a large effect size ($\omega^2 = .18$). Differences were also present in the mean classroom management construct scores over time ($F_{(2,191)} = 4.86$, $p = .01$). The effect size for the difference was a medium effect size ($\omega^2 = .09$).

Table 2
Teaching Efficacy Constructs Over Time

	Student engagement		Instructional strategies		Classroom management	
Time	M_1	*SD*	M_2	*SD*	M_3	*SD*
Prior to methods course	6.56	1.03	6.61	1.11	6.76	1.18
After methods/before student teaching	7.02	0.94	7.25	0.94	7.17	1.05
After student teaching	7.11	1.03	7.43	0.96	7.34	1.04
Overall	6.89	1.03	7.09	1.07	7.09	1.11

Note. Scale: 1 = nothing, 3 = very little, 5 = some influence, 7 = quite a bit, 9 = a great deal.

Bonferroni multiple comparisons *post hoc* corrections were calculated to examine the mean differences over time. For the student engagement construct, there was a significant difference ($p < .05$) in the student engagement score from before the methods course ($M = 6.65$, $SD = 1.03$) to after the methods course/before student teaching ($M = 7.02$, $SD = .94$). However, a significant difference ($p > .05$) was not found from after the methods course/before student teaching ($M = 7.02$, $SD = .94$) to after student teaching ($M = 7.11$, $SD = 1.03$). A significant difference ($p < .05$) was found in the instructional strategies score from before the methods course ($M = 6.61$, $SD = 1.11$) to after the methods course/before student teaching ($M = 7.25$, $SD = .94$). However, a difference ($p > .05$) was not found from after the methods course/before student teaching ($M = 7.25$, $SD = .94$) to after student teaching ($M = 7.43$, $SD = .96$). The classroom management construct did not reveal similar results as the student engagement and the instructional strategies scores. As reported in Table 3 and like the other constructs, a significant difference was found in the overall teaching efficacy score for classroom management. However, a significant difference ($p > .05$) was not found from either before the methods course ($M = 6.76$, $SD = 1.18$) to after the methods course/before student teaching ($M = 7.17$, $SD = 1.05$) or from after the methods course/before student teaching ($M = 7.17$, $SD = 1.05$) to after student teaching ($M = 7.34$, $SD = 1.04$).

Table 3
Analysis of Variance (ANOVA) of Teaching Efficacy Scores

Construct	M_1	M_2	M_3	F	P	ω^2
Student engagement	6.56	7.02	7.11	5.84	.00	.09
Instructional strategies	6.61	7.25	7.43	12.16	.00	.18
Classroom management	6.76	7.17	7.34	4.86	.01	.09

Conclusions and Implications

Objective 1 sought to describe the overall teaching efficacy of the preservice teachers. The overall teaching efficacy scores increased at each data collection point and over the entire final year of the agricultural teacher education programs. These findings are consistent with Roberts et al. (2006) and Knobloch (2002), in which overall teaching efficacy increased from the beginning to the end of the student teaching experience. Based on the results of this study, the teacher education programs at UGA and TAMU and the respective experiences of the preservice teachers during their final year of the teacher education programs have had a positive impact on teaching efficacy. In fact, this study shows that the teaching efficacy of the preservice teachers has been developed to a point where preservice teacher felt they have "Quit a Bit" of influence in affecting student engagement, mastering instructional strategies, and handling classroom management (Tschannen-Moran & Woolfolk Hoy, 2001).

This finding should be encouraging to the agricultural teacher education institutions that were examined. However, in studies similar to this one, preservice teaching efficacy is usually the highest during the preservice years but decreases during the first year of teaching and with teaching experience (Hebert et al., 1998; Soodak & Podell, 1997). Will the participants of this study have similar decreases in teaching efficacy during the first years of teaching?

Future research should build on the results of this study and seek to specifically identify the actions of teacher education programs that assist teaching efficacy development. Future research should also seek to determine if the findings related to high preservice teaching efficacy followed

by lower teaching efficacy after professional experience (Soodak & Podell, 1997) are similar to preservice teachers of agriculture.

The methods courses and the student teaching experiences were effective. According to findings for objective 2, preservice teachers are more confident in student engagement, instructional strategies, and classroom management after completing the program. The teaching efficacy scores indicated that the preservice teachers perceived themselves to be the most efficacious in instructional practices and classroom management and the least efficacious in student engagement. Because each construct of preservice teachers' sense of teaching efficacy improved after the teaching methods class and student teaching, perhaps the "practice teaching" inherent in both experiences is the key to improved teaching efficacy. Future research should determine the specific teaching efficacy benefits of early field-based experiences such as "microteaching" or "student teaching."

Because student engagement was the area where preservice teachers were least efficacious, future practice in teacher education should focus on developing teaching efficacy in the construct associated with teacher facilitation of "competence, extrinsic rewards, intrinsic interest, social support, and sense of ownership" (Newmann, 1989, p. 34). Linnebrink and Pintrich (2003) even called for all teachers to focus on improving student engagement. "By high school, as many as 40% to 60% of students become chronically disengaged," and many go on to drop out of school (Klem & Connell, 2004, p. 262). Student engagement leads to students' academic success and improved behavior in school, regardless of socioeconomic status (Klem & Connell). Improving preservice teaching efficacy/confidence in fostering student engagement is crucial.

Agricultural education is a ripe academic area for improving student engagement. The context of agriculture, the buffet of laboratory possibilities, and the opportunity for students to participate in student leadership organizations like the National FFA Organization should be presented to future teachers as important ways of enhancing student engagement. Future research should compare agricultural education preservice teachers to preservice teachers in other academic areas to gauge the validity of the aforementioned propositions.

Objective 3 sought to describe the significance of the change in teaching efficacy scores in student engagement, instructional strategies, and classroom management at each data collection point over time. There was a difference over time in the overall student engagement scores. Specifically, student engagement scores significantly improved from before the methods course to after the methods course, and there was no significant improvement in student engagement scores from before student teaching to after student teaching. The significant change from before methods to after methods/before student teaching may be due to specific, regular instruction in student engagement and the "practice teaching" done during the methods class. Instructors should continue with much of the procedures employed thus far, but additional studies should be conducted to determine factors/procedures in the methods classes that significantly impact the preservice teaching efficacy. Research should also be conducted to determine why there is not a significant change in the student engagement scores from after the methods course/before student teaching to after student teaching.

Instructional strategies teaching efficacy scores also significantly improved from before the methods course to after the methods course/before student teaching, and the student teaching experience did not appear to improve teacher efficacy in instructional strategies. The significant change from before methods to after methods/before student teaching is most likely due to the concomitant coaching in instructional strategies and the "practice teaching" during the methods class. As stated previously, future research should be conducted to specifically identify methods in the teaching methods course that are contributing to the large effect.

Like the constructs of student engagement and instructional strategies, a significant difference was found in the

overall teaching efficacy score for classroom management, but the differences over time were not significant. Teaching efficacy in classroom management may not have significantly improved from before the methods class to after the methods class because this is the one area where the least amount of practice is offered. Also, compared with instructional strategies and student engagement, less time was spent discussing how to handle student discipline problems. The lack of significant gain from before student teaching to after student teaching could also be attributed to placement in the high quality internship centers.

Future research should attempt to determine exact factors in the methods and student teaching process that affect the preservice teachers' teaching efficacy in classroom management. This information could be imperative to improving and sustaining teaching efficacy in the early years of teaching, thus addressing the growing teacher shortage epidemic.

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