

Preservice Agricultural Education and Secondary Education Teachers' Self-Efficacy and Professional Identity

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Abstract

The purpose of this study was to describe the self-efficacy and professional identity of preservice agricultural education teachers and other secondary education preservice teachers. Data were collected from respondents (n = 85) from 13 institutions and included both agricultural education preservice teachers (n = 68) and other secondary education preservice teachers (n = 17). The instrument used in this study was a modified questionnaire that combined two previously established scales, Tschannen-Moran and Woolfolk Hoy's (2001) Teacher's Sense of Efficacy Scale and Woo's (2013) Professional Identity Scale in Counseling. Descriptive statistics revealed that agricultural education preservice teachers possessed a slightly higher level of self-efficacy than other secondary education preservice teachers. Conversely, secondary education preservice teachers possessed a slightly higher level of professional identity than agricultural education preservice teachers. A Spearman's rho Correlation was used to reveal a negligible relationship between self-efficacy and professional identity among agricultural education preservice teachers. However, there was a small relationship between self-efficacy and professional identity among secondary education preservice teachers. Further research should be conducted to establish the development of self-efficacy and professional identity throughout the teacher career cycle through longitudinal studies.

Keywords: professional identity; self-efficacy; preservice teachers

Introduction

Over the past several decades, the American education system has evolved to integrate core content and career technical education (CTE) through the implementation of science, technology, engineering, and mathematics (STEM) education (Stone, 2011). This merger has resulted in a desire for interdisciplinary involvement amongst teachers, promising greater comprehensive learning and cooperative design (Crow & Pounder, 2000; Pounder, 1999). This trend encourages agricultural education teachers to work closely with their core content teaching peers. However, agricultural

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education teachers see themselves as different, having a strong kinship toward their agricultural subject matter, other agricultural educators, and agricultural industry professionals (Herren & Hillison, 1996).

One area of distinction between agriculture teachers and core content teachers is their teacher preparation experience. Coursework required by preservice teachers within the college of education includes a curriculum which encompasses the learning process, classroom management and discipline, curriculum development, the use of instructional technology, preparation in multicultural education, school law and finance, and use of instructional materials and classroom teaching techniques (Morey et al, 1997). This results in a strong emphasis on pedagogy. Conversely, preservice agricultural education degree programs are traditionally housed within colleges, schools, and departments of agriculture and include a wide range of coursework focused on technical content (Myers & Dyer, 2004). This approach reduces the amount of pedagogical studies to which a preservice teacher is exposed. While the agricultural focus has been warranted, recent shifts in agricultural education have illustrated a need to integrate more STEM education and interdisciplinary curriculum into school-based agricultural education programs (Haugh, 2011). This has led to recommendations for research to identify the best methods that teacher educators can employ to prepare agricultural education teachers for this expanded role (Myers & Dyer, 2004).

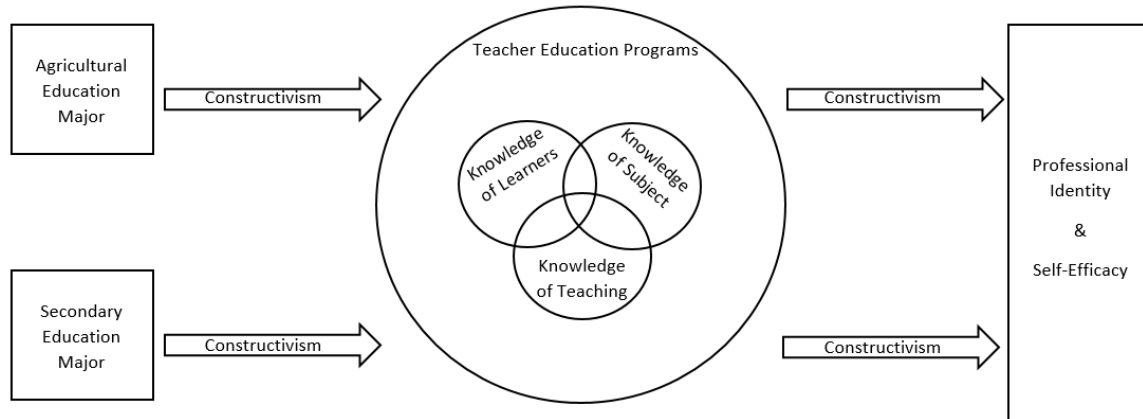
As a result of the unique relationships and roles associated with agricultural education teachers (Terry & Briers, 2010), many preservice preparation programs have separated agricultural education students from their secondary education counterparts through separate courses, despite having similarly intended outcomes. Due to a lack of comparative research between agricultural education preservice teachers and traditional secondary education preservice teachers, this study acts as a starting point for exploring the differences that may possibly exist between the two groups regarding their development of professional identity and self-efficacy. Teachers possessing a strong sense of self-efficacy and professional identity are more likely to experience success in the classroom (Ashton & Webb, 1986; Bandura, 1997; Dembo & Gibson, 1985; O'Bryant, 1992; Putman, 2012; Skaalvik & Skaalvik, 2008; White, 2009; Woolfolk et al., 1990). Therefore, examining the self-efficacy and professional identity differences between agricultural education and core content preservice teachers can assist in addressing the need for prepared and professional teachers in agricultural education, which is a priority cited within the American Association of Agricultural Education's most recent research agenda (Roberts et al., 2016).

Theoretical/Conceptual Frameworks

The theoretical framework, illustrated in Figure 1, guided the design and data collection for the study (Bransford et al., 2005). It combines the Framework for Understanding Teaching and Learning, Model of Professional Identity Development (Woo, 2013), and Social-Cognitive Theory (Bandura, 1977). The illustration depicts the development of a student's professional identity and self-efficacy beginning with their degree program and moving through their teacher education program experience. Students are shown as constructing their professional identity and self-efficacy in alignment with their degree program.

Figure 1

The Combined Framework for Understanding Teaching and Learning, Model of Professional Identity Development, and Social-Cognitive Theory model



Within this model, though both agricultural education and secondary education majors frequently process their credentialing paperwork with the college of teacher education and assume the title of preservice teacher, separate colleges may confer their degrees. As they make the transition into the teacher education program, the constructivist learning theory is applied to demonstrate their ability to construct knowledge. It is worth noting that the constructivist pathway is exclusive for each group, as the literature has stated; knowledge is both unique and personal, and is constructed through individual and social experiences (Doolittle & Camp, 1999). The college of agriculture and college of education offer different individual and social experiences to their students, resulting in a different internalization of the same content. That content is represented by the teacher education program. While many teacher preparation programs have characteristics that distinguish agricultural education students from other education students (Shoulders, 2012), the components of teaching and learning highlighted within the two teacher preparation programs, including building students' knowledge of learning, of the subject, and of teaching, are the same (Bransford et al., 2005).

Framework for Understanding Teaching and Learning

The teacher education program strives to prepare students of all disciplines for a changing world. This model identifies the key concepts required for the successful understanding of teaching and learning through knowledge of learners, subject, and teaching. These concepts, when balanced, revolve around the ideal vision of the teaching profession, as described by Bransford et al. (2005). Preservice teachers construct this conceptual knowledge through their required courses, field work, and observations. At the completion of their teacher education program, they have begun to develop their sense of professional identity and self-efficacy as teachers as a result of their experiences (Bandura, 1977; Moss et al., 2014). This development is illustrated by separate arrows representing the different individual and social experiences that have been provided by their disciplinary colleges which contribute to their senses of self-efficacy and professional identity.

Bransford et al. (2005) stated it is paramount that teachers understand their roles and responsibilities as a professional within their school community. While the roles and responsibilities of the agricultural education teacher are unique (Terry & Briers, 2010), the concept of any teacher's

professional role within a school manifests within a teacher's professional identity. Gibson et al. (2010) explained that an individual's professional identity is shaped within a person, and is a result of interpersonal dimensions that relate to one's relationship with society and their professional community. However, the phenomenon behind the development of an individual's professional identity is still largely under-researched. Because existing research regarding professional identity is restricted to specific populations at certain points of time, and few longitudinal studies on professional identity exist (Dobrow & Higgins, 2005; Monrouxe, 2009), several studies have expressed a need for greater information regarding the development of professional identity throughout the professional life span (Bischoff et al., 2002; Brott, 2006; Brott & Myers, 1999; Dollarhide et al., 2013; Gibson et al., 2010; Howard et al., 2006; Rønnestad & Skovholt, 2003; Skovholt & Rønnestad, 1992).

Model of Professional Identity Development

Multiple researchers (Brown, 1989; Smith, 2004; Vacc & Loasch, 1987) defined knowledge of the profession as a critical component of professional identity and one that is foundational to becoming an insightful member of the profession (Emerson, 2010). In the profession of counseling, this knowledge is considered to be the basic knowledge that includes history, professional preparation, credential and certification, ethical standards, and peer reviewed journals (Woo, 2013). Additionally, an understanding of the philosophy of the profession is imperative to achieving a strong sense of professional identity (Remley & Herlihy, 2007). In counseling practitioners, they are able to distinguish their philosophy from other health care professionals. Scholars (Lafleur, 2007; Brott & Myers, 1992) believed that an individual's agreement with the philosophy of their profession is at the core of their professional identity.

The roles and expertise of a profession builds upon a body of knowledge and philosophy that is unique to the profession and usually not known by the public (Elliot, 1972; Emener & Cottone, 1989, McCully & Miller, 1969; Pietrofesa & Vriend, 1971). The literature for the counseling profession stated that the acquisition of expert knowledge, theory, and skills are vital to performing in professional roles that aid in professional identity formation (Van Zandt, 1990). Maintaining a positive relationship between oneself and the profession also contributes to the creation of professional identity (Brott & Myers, 1999; Gale & Austin, 2003; Mrdjenovich & Moore, 2004; Sweeny, 2001; VanZandt, 1990). This positive attitude and sense of pride for the profession demonstrates recognition of the profession's history, commitment to present practices, and faith in the future of the profession (VanZant, 1990).

Professional engagement behavior is another critical aspect of professional identity development (Feit & Lloyd, 1990; Gale & Austin, 2003; Myers & Sweeny, 2004; VanZandt, 1990; Zimpfer et al., 1992). Examples of these kinds of engagement behaviors include the involvement in professional associations, publishing and presenting, reading professional research and journals, advocacy efforts, maintaining credentials, and participating in community services (Healey & Hays, 2011; Puglia, 2008). Healey and Hays (2011) referred to these behaviors as actions taken by counselors who wish to become part of the profession. Finally, the purposeful or guided interaction in the professional community develops one's professional identity (O'Bryane & Rosenberg, 1998). Dollarhide and Miller (2006) posited the interaction process of immersion into professional culture provides the individual the opportunity to learn appropriate professional values, attitudes, ways of thinking, and problem solving strategies (Gibson et al., 2010).

Social-cognitive Theory

The foundation of self-efficacy theory is derived from Albert Bandura's (1977) Social-cognitive Theory. This theory acknowledges that individuals are not living in an isolated environment; instead, they develop and function within numerous social influences (Bandura, 1986). Bandura (1986)

explained that an individual's behavior, personal factors, and external environments all exist in a triadic reciprocal system. The interaction of the factors is very situational, as Bandura (1977) explained, "there are times when environmental factors exercise powerful constraints on behavior, and other times when personal factors are the overriding regulators of the course of environmental events" (p. 10). All these factors work together to define an individual's reality. Pajares (2000) stated that individuals are both "the products and producers of their environment and of their social systems" (p. 2). From this approach, emerged self-efficacy. Bandura (1997) defined self-efficacy as the "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3).

Self-efficacy has been identified as an indicator of teacher professional identity (Day, 2002). Professional identity describes how teachers see themselves as players within their contexts (Kelchtermans, 2009), and that perception "manifests itself in teachers' job satisfaction, occupational commitment, self-efficacy, and change in level of motivation" (Canrinus et al., 2012, p. 116). In their study of the factors contributing to professional identity, Canrinus et al. (2005) found teachers' self-efficacy influenced the other indicators of professional identity. While their study focused on secondary school teachers, it was conducted in the Netherlands, and therefore the population did not include agricultural education teachers.

Purpose and Objectives

The purpose of this study was to describe the self-efficacy and professional identity of preservice agricultural education teachers and other secondary education preservice teachers. The following objectives guided the study:

1. To describe the self-efficacy of agricultural education preservice teachers and other secondary education preservice teachers.
2. To describe the professional identity of agricultural education preservice teachers and other secondary education preservice teachers.
3. To describe the relationship between agricultural education preservice teachers' self-efficacy and professional identity.
4. To describe the relationship between other secondary education preservice teachers' self-efficacy and professional identity.

Methods

Population and Sample

The population for this study included all land-grant colleges and universities with both agricultural education and teacher education departments. Land-grant colleges and universities were selected in order to give the population some uniform parameters and obtain an accurate sampling frame; the institutions were selected by cross referencing the National Association of Agriculture Educators' (NAAE) college database with the list of National Institution of Food and Agriculture (NIFA) Land-Grant Colleges and Universities. There were 53 institutions identified as being established through the Land-Grant Acts (1862, 1890, and 1994) that included both agricultural education and teacher education departments. Of the initial 53 institutions that created the population for this study, 21 agreed to participate in the survey. The office of teacher education was contacted first for each institution to establish a contact for agricultural education and secondary education preservice teachers. Three were removed because the agricultural education degree program was only offered at the Master's level, three were removed because their institution no longer offered an agricultural education degree, and two were removed because their agricultural education programs were not housed in the college of agriculture. An additional 24 institutions opted out of the study ($n = 11$) or did not respond ($n = 13$) to the initial invitation or the three follow up email and telephone invitations.

Whether a participant was grouped in agricultural education or in secondary education was determined by the respondents' self-reported major. Requirements for participation were based on the preservice teachers' eligibility to enroll in their summative internship in the spring of 2018, having completed at least 80% of their degree coursework for their respective degree program.

Instrument Development and Testing

The instrument developed for this study was modified by the researcher from two previously established scales. The use of previously established scales is recommended to ensure validity and reliability (Ary et al., 2010).

The construct of professional identity was measured using an adaptation of the Professional Identity Scale in Counseling (PISC) which focuses on six subscales: knowledge of the profession, philosophy of the profession, professional roles and expertise, personal attitude, engagement behavior, and professional values (Woo, 2013). The comprehensive list of items within each subscale have been identified through their repeated appearance in literature regarding professional identity and congruency with the philosophy of counseling. The PISC included 62 questions on a six-point Likert scale that ranged from "not at all in agreement" to "totally in agreement". Examples of questions include: "I know the origins of the counseling profession", "It is important to empower clients through an emphasis on personal strengths", and "I educate the community and public about my profession" (Woo, 2013, p. 102-106).

For the instrument's use in the current study, questions were modified to reflect the education profession. The face and content validity of the modified instrument were tested through cognitive interviews with an agricultural education professor and graduate student. Changes to the instrument were based on the interviewees' suggestions to improve clarity and readability. The modified instrument was pilot tested to determine reliability using preservice agricultural education students at the University of Arkansas. An overall internal consistency ($\alpha = 0.783$) was achieved after removing four questions from the engagement behaviors subscale.

The construct of self-efficacy was measured using the Teacher's Sense of Efficacy Scale (TSES) which evaluates the teacher's perceived efficacy of student engagement, instructional strategies, and classroom management (Tschannen-Moran & Woolfolk Hoy, 2001). The TSES was adapted from original form to include 22 items that asked how much, how well, or to what extent a teacher can do for their student. The responses were indicated on a nine-point Likert scale that ranged from "nothing" to "a great deal". Examples of questions included: "How much can you do to get through to a difficult student", "How well can you respond to difficult questions from your students", and "To what extent can you craft good questions for your students". Internal consistency calculations were deemed to be acceptable ($\alpha = .709$).

The two instruments were combined into a single questionnaire. A panel of experts consisting of four faculty members from Agricultural and Extension Education programs at two different institutions evaluated the questionnaire's face and content validity and deemed it to be acceptable for the purpose of this study. The finalized instrument consisted of 68 questions on a Likert scale, 46 used to measure professional identity and 22 questions to measure self-efficacy.

Methods and Procedures

After approval from the Institutional Review Board (IRB) was granted at the beginning of the 2017-2018 academic school year, initial contact was made with the office of teacher education at each of the 52 land-grant institutions. Once a primary contact had been determined, and electronic or mailed survey preference recorded, the institutions received a standard pre-notice letter via email four days prior to the scheduled survey administration. Both mailed and electronic survey correspondence included a letter to the primary contact with instructions and information on incentives with a consent form. The consent forms were addressed to the preservice teachers and provided information regarding the purpose of the study and thanked the respondents for participating. To increase response rates, incentives were included by raffling off two \$25 gift cards to those respondents who completed the survey.

The electronic survey was administered through Qualtrics and was the same for all respondents. The Qualtrics survey was adapted to a paper copy for those who opted to complete a mailed survey. Both surveys were estimated to take 30 minutes to complete. Due to the varied schedules at each institution, the respondents were given nine weeks to complete the surveys. For those who opted to complete electronic surveys, emails were sent to remind them weekly of the survey's deadline and offer replacement Qualtrics links.

Data Analysis

To address objectives one and two, descriptive statistics were used to describe the self-efficacy and professional identity in respondents. Mean values and standard deviations were calculated using Microsoft Excel. Objectives three and four sought to compare the relationship between self-efficacy and professional identity in agricultural education and secondary education preservice teachers using the Spearman's rho Correlation test in SPSS.

Demographic Characteristics

The population for this study combined agricultural education preservice teachers ($n = 68$) and other secondary education preservice teachers ($n = 17$) from 13 land-grant universities. Based on the 52 identified land grant institutions, the institutional response rate was 25%; therefore, nonresponse error was a limitation within this study. Because multiple attempts were made to collect data from those invited to participate and comparison of early to late respondents cannot prove the absence of nonresponse bias (Johnson & Shoulders, 2019), no further attempt was made to address nonresponse bias. While we recognize this as a limitation to the study and caution readers against generalizing the findings beyond the participants, we provide the results below as a baseline for examining professional identity in agricultural education preservice teachers and as a springboard for further research in the examination of the similarities and differences between the professional identities of agricultural education and other secondary education preservice teachers. Participant demographics collected included gender, university, and major.

Gender

Respondents were asked which gender they identified with to acquire gender demographics from the participating universities. The majority of respondents were female ($n = 60$; 71%). Seven respondents (8.24%) did not disclose their gender.

University

Responses were collected from preservice teachers at 13 land-grant universities. One university provided both agricultural education and other secondary education preservice teachers, seven universities provided only agricultural education preservice teachers, and five universities provided only secondary education preservice teachers. Respondents are displayed by university in Table 1.

Table 1
Preservice Teachers' University (n = 85)

University	<i>f</i>	%
Alabama A&M	1	1.18
University of Arkansas	4	4.71
University of Florida	12	14.12
University of Georgia	1	1.18
Kansas State University	2	2.35
University of Kentucky	14	16.47
Montana State University	3	3.53
University of Nebraska	10	11.76
New Mexico State University	1	1.18
Oregon State University	5	5.88
Pennsylvania State University	10	11.76
Purdue University	1	1.18
Texas A&M University	21	24.70
Total	85	100.00

Major

Respondents were asked to report their major so the researcher could distinguish between agricultural education and secondary education preservice teachers. Nine different majors were identified in this study. Majors reported as agricultural science, career and technical education, agricultural and extension education, and agricultural education and communication were coded as agricultural education (80%). Social science and social studies were coded as history, engineering technology teacher education was coded as technology, and education was coded as secondary education (20%). Other secondary education majors included family and consumer science, music, English, Spanish, and math. Results are shown below in Table 2.

Table 2
Preservice Teachers' Major (n= 85)

Major	<i>f</i>	%
Agricultural Education	68	80.00
Secondary Education	3	3.53
History	3	3.53
Technology	1	1.18
Music	3	3.53
Family & Consumer Science	1	1.18
Spanish	2	2.35
English	2	2.35
Math	2	2.35

Findings

Objective one sought to describe the self-efficacy of agricultural education preservice teachers and other secondary education preservice teachers. Using descriptive statistics, the means and standard deviations were calculated in Microsoft Excel for the responses of the Teacher Self Efficacy Scale for agricultural education preservice teachers ($n = 68$) and the other secondary education preservice teachers ($n = 17$). Table 3 displays the summated mean scores and standard deviations for each sample group's overall score, as well as their score for each of the instrument's sub scales: student engagement (six items), instructional strategies (seven items), and classroom management (eight items).

Table 3

Self-efficacy of Agricultural Education Preservice Teachers and Other Secondary Education Preservice Teachers

Self-Efficacy	Range	Agricultural Education ^a		Secondary Education ^b		Cohen's <i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Engagement	6-54	39.72	8.46	39.71	4.98	0.00
Instruction	7-63	46.03	10.10	45.59	7.63	0.05
Management	8-72	54.91	11.45	50.94	6.41	0.44
Overall	21-189	149.21	24.51	143.0	14.75	0.32

Note. ^a $n = 68$, ^b $n = 17$, Instrument based on a 9-point Likert scale (1 – nothing to 9 – a great deal).

Overall, agricultural education preservice teachers scored higher than secondary education preservice teachers in all subscale areas of the Teacher Self Efficacy Scale. Both agricultural education and secondary education preservice teachers scored highest in the classroom management subscale. The classroom management subscale also revealed the greatest difference between the two groups with a moderate effect size (Cohen's $d = 0.44$). In student engagement and instructional strategies, the effect size was small.

Objective two sought to describe the professional identities of agricultural education preservice teachers and other secondary education preservice teachers. Using descriptive statistics, the means and standard deviations were calculated in Microsoft Excel for the responses of the Professional Identity Scale for agricultural education preservice teachers ($n = 68$) and the other secondary education preservice teachers ($n = 17$). Table 4 displays the summated mean scores and standard deviations for each sample group's overall score, as well as their score for each of the instrument's sub scales: knowledge of the profession (seven items), philosophy of the profession (three items), professional roles and expertise (six items), personal attitude (11 items), engagement behavior (10 items), and professional values (six items).

Table 4

Professional Identity of Agricultural Education Preservice Teachers and Other Secondary Education Preservice Teachers

Professional Identity	Range	Agricultural Education ^a		Secondary Education ^b		Cohen's <i>d</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Knowledge of the Profession	7-49	39.46	5.72	39.82	5.77	0.06
Philosophy of the Profession	3-21	16.87	2.93	18.59	4.96	0.44
Professional Roles and Expertise	6-42	35.91	6.76	37.53	4.96	0.28

Table 4

Professional Identity of Agricultural Education Preservice Teachers and Other Secondary Education Preservice Teachers, Continued...

Attitude	11-77	65.46	11.12	67.29	6.74	0.20
Engagement Behavior	10-70	48.06	12.02	49.41	9.04	0.13
Professional Values	6-42	30.47	8.37	35.24	6.33	0.65
Overall	43-301	236.22	33.68	246.82	27.80	0.34

Note. ^a*n* = 68, ^b*n* = 17, Instrument based on a 7-point Likert scale (1 – strongly disagree to 7 – strongly agree).

Overall, secondary education preservice teachers scored higher than agricultural education preservice teachers in all subscale areas of the Professional Identity Scale. Both agricultural education and secondary education preservice teachers scored highest in the attitude subscale. The professional values subscale revealed the greatest difference between the two groups with a large effect size (Cohen's *d* = 0.65). Moderate effect sizes were found between the two groups in the Philosophy of the Profession, Professional Roles and Expertise, and Attitude. Knowledge of the Profession and Engagement Behaviors revealed a small effect size.

Objective three sought to describe the relationships between self-efficacy and professional identity in agricultural education preservice teachers. Data were analyzed using a Spearman's rho Correlation to determine if a relationship existed between two independent variables, self-efficacy and professional identity. After the initial test was run, assumptions of linearity were not met. A square root transformation was applied to both variables to reveal a slightly negative linear relationship. Not all variables were normally distributed, as assessed by the Shapiro-Wilk's Test ($p < .05$). However, the decision to continue was justified by the robust nature of the Spearman's rho Correlation method.

The Spearman's rho Correlation was run using SPSS and revealed a negligible correlation ($r_s = .078$) between self-efficacy and professional identity in agricultural education preservice teachers. The indicated scores on one variable explained less than 1% ($r^2 = .006$) variance in the other variable.

Objective four sought to describe the relationship between secondary education preservice teachers' self-efficacy and professional identity. Data were analyzed using the Spearman's rho Correlation method to determine if a relationship existed between two independent variables, self-efficacy and professional identity. The data revealed a slightly positive linear relationship between the variables. Assumptions of normality were also met.

The Spearman's rho Correlation was run using SPSS revealed that there was a small correlation ($r_s = .20$) between self-efficacy and professional identity in secondary education preservice teachers. Thus, one variable explained 4% ($r^2 = .04$) of the variance in the other variable.

Conclusions and Implications

Nonresponse bias is a major limitation of this study; therefore, we caution the reader against generalizing these findings beyond the respondents. However, as this study was the first of its kind to report differences in professional identity between agricultural education preservice teachers and other secondary education preservice teachers, the conclusions, implications, and recommendations can provide opportunities for others to generate research questions, design studies to confirm or refute these findings among other or broader populations, and explore the role professional identity may play in preservice teachers' self-efficacy. Therefore, we share the following conclusions, implications, and

recommendations with the intention of providing baseline thought as a catalyst for future research and idea generation.

Self-efficacy was evaluated using the Teacher Self Efficacy Scale and revealed that both groups perceived themselves as generally self-efficacious, with agricultural education preservice teachers scoring slightly higher in all areas. The generally effective scores have been previously reported by Rimm-Kaufman and Sawyer (2005), who described preservice teachers as being generally effective in areas of instruction and management. Chan (2008) presented a conflicting view when he reported that preservice and new career teachers were significantly less effective in the area of classroom management. However, results from the current study were inconsistent with Chan's (2008) findings, as both agricultural education and secondary education preservice teachers scored highest in this area.

These findings could imply the success of degree programs as they prepare efficacious teachers for the classroom. Knobloch and Whittington (2001) accredited this success to the implementation of field observations and peer teaching experiences prior to student teaching, as these experiences raise preservice teachers' sense of self-efficacy. However, the level at which preservice teachers in this study were exposed to these teaching experiences were not reported. Therefore, the lack of experience could also imply a sense of false self-efficacy which Knobloch and Hoy (2008) and Woolfolk et al. (2005) reported as a result of not yet being exposed to the full time demands and independence of an in-service teacher.

As for the slight increase in efficacy for agricultural education preservice teachers, this could imply the strong sense of career commitment that these preservice teachers possess, as reported in previous studies by Blackburn and Robinson (2008), Knobloch and Whittington, (2003), and Whittington et al. (2006). This is important because Smith et al. (2017) reported hundreds of school based agricultural education teaching positions being left unfilled. A strong sense of commitment to the teaching career and a high sense of self-efficacy could help battle teacher attrition rates. All disciplines of education have been affected by this teacher shortage. Hughes (2012) reported that between 20% and 50% of all teachers leave the classroom within the first five years of teaching, and a teacher's lack of self-efficacy has been identified as a contributing factor according to Skaalvik and Skallvik (2008), and Whittington et al. (2006).

Secondary education preservice teachers held a slightly higher sense of professional identity in all areas. Overall, the scores were generally high. This could imply the success of teacher education programs based on the conclusion of Brott and Myers (1992) and Lafleur (2007) who identified strong professional identity as an indicator of career success in counselors. The comparison of counseling to education has previously been established and deemed appropriate by Kagan (1988). While professional identity research in the educational field is limited, educational researchers Conley and Cooper (1991), Darling-Hammond (1984; 1995), and McLaughlin and Talbert (1993) have reported increases in teacher commitment, performance, and student learning as a result of professional identity development.

The slight increase in secondary education over agricultural education may be explained by what Shoulders and Myers (2012) posited as the agricultural education teacher's alignment to the agricultural profession rather than the educational profession. This discrepancy between agriculture and education has been previously noted by Herren and Hillison (1996) who refer to the way agriculture teachers' perceive their subject matter, agricultural educators, and the agricultural profession with a strong kinship. When comparing the literature of Morey et al.'s (1997) to Myers and Dyer's (2004) in regards to teacher preparation, there is less of a focus on pedagogy among agricultural education degree programs. Shulman (1986; 1987) argued that the importance of fundamental pedagogical knowledge

surpassed that of content specialization. Therefore, this deficit may help explain the difference in how the groups perceive their professional identity as an educator.

It should be noted that this difference does not empirically prove that secondary education preservice teachers with a higher sense of professional identity are better at teaching. However, this slight decrease in professional identity among agricultural education preservice teachers could imply a threat to the agricultural education profession. Professional identity transcends the individual and affects the larger profession. O' Bryant (1992) and White (2009) explained that professional identity influences one's ability to advocate for their discipline or profession. Smith et al. (2017) reported that in the case of agricultural education, the profession is currently plagued by a teaching shortage. Attrition rates among agriculture teachers could be worsened by their lack of alignment with professional identity.

The Spearman's rho Correlation method yielded negligible correlation ($r^2 = 0.08$) between the self-efficacy and professional identity. However, Brott and Myer's (1999) and Lafleur's (2007) research has stated professional identity indicated success and the research of Knobloch (2001) stated self-efficacy indicated classroom success. This lack of correlation between these two indicators of success could imply that agricultural education preservice teachers are experiencing disconnect between their perceived ability to teach and their perceived identity as a teacher. This implication was recognized by Shoulders and Myers (2012) who reported that in-service agricultural teachers feel their professional development is not congruent with their sense of professional identity.

A small correlation ($r^2 = 0.04$) was revealed between the two variables through the Spearman's rho Correlation method. As stated previously, this small correlation is inconsistent with Brott and Myer's (1992) and Lafleur's (2007) research that stated professional identity indicated success and the research of Knobloch (2001) which stated self-efficacy indicated classroom success. However, the small relationship between these two indicators of success could be accredited to the interdisciplinary nature of secondary education. Within education, Kaufman and Brooks (1996) reported that collaboration is encouraged among preservice teachers. Conversely, agricultural education is withheld from this collaboration. As stated by Herren and Hillison (1996), efforts made to place agricultural education preservice teachers closer to their subject specialists resulted in distancing themselves from pedagogical specialists. This alignment may result in secondary education preservice teachers that are more in sync with their sense of efficacy and identity as a teacher than their agricultural education counterparts.

Recommendations

Further research with more experienced teachers in the form of a longitudinal study is recommended to establish the trends of self-efficacy and professional identity throughout secondary teacher career cycles. This recommendation echoes that of Putnam (2012) who identified the vital need for creating career cycles that demonstrated self-efficacy as this has been linked to increase teacher retention. Additionally, Gibson et al. (2010) described the development of professional identity as a process that occurs over time and could be better examined through a longitudinal study. This research approach has been used in the counseling profession (Woo, 2013) but is lacking literature in the educational field. Being able to follow the development of self-efficacy and professional identity throughout preservice teacher preparation and into classroom life cycles could help strengthen degree programs' teacher preparation and reduce attrition rates among teachers of all disciplines.

The literature reviewed for this study indicates the possibility of a causal relationship between self-efficacy and professional identity; however, a more rigorous study that provides generalizability through continuous comparative research in this area is recommended to provide empirical evidence as

to of how self-efficacy and professional identity influence teacher success and how these constructs influence each other. Finally, in regards to the study's methodology, the use of a small, non-stratified sample created a limitation in generalizability. Maintaining sample sizes of equal value in both agricultural education and other secondary education that are generalizable to the preservice teacher population among land-grant universities is highly recommended to improve this study.

While the lack of generalizability of the findings herein limit our recommendations to practitioners, we provide the below initial recommendations for practitioners as a means of beginning efforts to improve preservice teachers' professional identities. Participants across disciplines reported perceptions of moderate efficacy, suggesting either quality preparation on behalf of the program or a sense of self-efficacy that is common among those with limited experience. We recommend that, following further study determining a more conclusive cause of these perceptions of self-efficacy, teacher preparation programs offer hands-on experiences that can either continue to bolster these perceptions (Knobloch & Whittington, 2001) or aid in providing students with the firsthand knowledge required to more accurately identify one's efficacy (Knobloch & Hoy, 2008; Wolfolk et al., 2005). We also recommend preservice teacher preparation programs incorporate professional identity awareness and development, including orientation of one's own disciplinary identity within broader public education and affiliated identities, within their programs. Preservice teachers within agricultural education held slightly lower professional identities than their counterparts within secondary education; a greater focus on this concept could assist those majoring in agricultural education to foster stronger senses of professional identity and those within other areas of secondary education to recognize those in agricultural education as members of their professional group, thereby further strengthening the identity of "teacher" among agricultural education students.

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