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Will the First Through Fifth Years Please Stand Up? Quantifying National SBAE Teacher Experience

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Abstract

Research often references years of experience specific to participants, yet no compiled report exists for secondary school-based agricultural education (SBAE) to holistically quantify years of teaching experience. In addition, definitions accounting for experience fall short of capturing the myriad ways experience counts in the broader teaching profession. Our study addresses this missing piece of the teacher retention puzzle. Using Quiñones, Ford, and Teachout's (1994) conceptual framework for work experience measures, our study quantified teacher experience in the National Association for Agricultural Education (NAAE). We analyzed National SBAE teacher experience through descriptive statistics, compared experience by region using an ANOVA model, and compared SBAE to the national teaching profession. We found practical significance in the difference between SBAE's population of 1-3 year teachers and 10-19 year teachers compared to the national teacher average. We pose questions around teacher recruitment and retention relative to the specific experience demographic of SBAE and the generational trends accompanying such demographics.

Keywords: years of experience; accounting experience; teacher retention; work experience; teacher experience; teacher recruitment; experience demographic

Introduction

"Stand up if you have one to five years of teaching experience," is a common request during an agriculture teachers' conference. Picture it: Dozens of early-career teachers from a state, region, or even across the United States, sheepishly rise. The exercise continues until there is an accounting of the room's teaching experience. Surprisingly and unfortunately, this is the only existing quantification for years of teaching experience nationally. We argue this is not enough of an accounting for teacher experience across School-Based Agricultural Education (SBAE).

In addition to lack of accounting, agricultural education lacks a clear definition regarding *experience*, particularly as a function of time. Most discuss specific *experiences* teachers have throughout their time in the classroom. Some discuss experience with content (Lambert et al., 2014;

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Watson et al., 2015; Wells et al., 2013), while others discuss experience to assess teachers' professional development needs (Figland et al., 2019; Wolf et al., 2010). Notably, much of the research around teacher experience focuses on the pre-service teacher experience (Hasselquist et al., 2019; Rice & Kitchel, 2015; Sellick et al., 2017; Smalley & Rank, 2019; Smalley & Retallick, 2011; Swan et al., 2011). While this research is certainly beneficial, there is an obvious lack of consideration for a teacher's career progression once they leave a pre-service program. Nothing in recent literature accounts for SBAE teacher experience as *time-in-classroom*.

Despite the emphasis placed on experience, little exists to quantify the experience of the SBAE teaching force. While significant efforts quantify demographic characteristics of teachers across disciplines (National Center for Education Statistics [NCES], Goldring et al., 2014), and supply and demand in agricultural education (National Supply and Demand Study: Smith et al., 2018), little data exists regarding the experience levels of current agriculture teachers.

Quantifying the experience levels of secondary school-based agricultural education (SBAE) goes beyond a simple measure and report of demographic data. This quantification has implications for career stages, attention to generational differences, and workforce development, among other lines of inquiry in agricultural education. From the practical standpoint of representing the teaching career to SBAE teachers, the National Association of Agricultural Educators (NAAE) identifies the life cycle of an agriculture teacher to include early-career, mid-career, and late-career (White, 2008). In the early-career stage, teachers are concerned with survival, teaching, and impact, while mid-career teachers tend to stabilize, experiment, and "take stock" professionally (White, 2008). There are notable challenges with this life cycle representation. First, these stages do not account for teaching experience in terms of time. Second, the amorphous categories of "career" do not account for the nuanced ways people build careers (e.g., lateral entry teachers) through a variety of experiences in the broader workforce. The focus, in this case, provides an accounting of high school teachers' careers by their professional association. However, SBAE does not have clearly reported data for how many teachers fall in each of these career stages. Understanding the experience range in SBAE allows professional organizations to better accommodate the needs of in-career teachers and allows for greater clarity regarding the career stages of the entire profession.

Given the limited research in agricultural education to discuss teaching as a professional career, we outline the career discussion in the broader workforce. Workplaces across the United States recognize a changing demographic as Millennials (born 1981-1996, Pew Research Center, 2018) and Generation Z (born after 1997, Pew Research Center, 2018) continue to comprise a larger percentage of the workforce. In deliberating experience as *time-in-workforce*, we explore the generational trends providing insight into people's thinking about their careers. Notably, the data presented in our study does not provide such insight, but identifying teacher experience as a function of *time-in-job* allows expanded thinking regarding differences in career experience and experience of careers. Gallup labels Millennials as a *job-hopping generation*, less likely to stay with one employer for more than a few years; a notable difference compared to their Generation X and Baby Boomer counterparts (Premack, 2018). Millennials and Generation Z tend to be less concerned about pensions, more likely to ask for benefits on the job, and more empowered to be selective about their employers, having never experienced a recession while in the workforce (Premack, 2018). Given the luxury of a robust job market, Millennials are also less likely to feel loyal to their employers (Premack, 2018). These are important characteristics, as Millennials now make up 35% of the United States workforce (Wakeman, 2018), trends which are also reflected in SBAE teachers. In addition, the United States workforce is experiencing the collision of varying, and potentially less compatible, workplace values as five-generations (Silent Generation through Generation Z, Pew Research Center, 2018), having vastly different coming-of-age experiences, co-exist across the United States workforce and in SBAE.

Clarity around career stages and a changing workforce challenges researchers to recognize issues of quantification and reporting of years of experience beyond the state level. Further research may enable the address of retention, professional development, and potential interventions to aid in successful mid-career changes. National cross-disciplinary data (NCES) accounts for teacher experience in categories of 1-3 years, 4-9 years, 10-19 years, and more than 20 years of teaching experience (Goldring, et al., 2014). A similar accounting system in agricultural education would provide a comparison allowing exploration of the similarities between the initiatives and trends in agricultural education and the broader education profession. Given the need, we are excited to begin the process of quantifying teacher experience in secondary SBAE at the national level.

Purpose and Objectives

NAAE Region I is the only currently reported region for teacher experience (Haddad et al., 2018), yet Region 1 makes up only 15% of the SBAE teacher population. Further research is needed to quantify the teacher experience demographic and offer a comparison of SBAE to the national teaching profession. Thus, we pose the following research questions:

1. What are the average years of experience of secondary school-based agricultural educators in the United States?
2. Do the average years of teaching experience vary by NAAE Region?
3. How does SBAE teacher experience compare to overall teacher experience across the United States?

This work aligns with the American Association for Agricultural Education (AAAE) Research Priority 3, Question 2: "What methods, models, and practices are effective in recruiting agricultural leadership, education, and communication practitioners (teachers, extension agents, etc.) and supporting their success at all stages of their careers?" (Roberts et al., 2016).

Review of Literature

Little data exists in the education literature exploring the workforce development of the teaching profession. Thus, we begin by situating teachers in a broader picture of workplace experience, largely drawing on studies of military personnel and personnel psychology. While definitions across the literature remain broad, we focus our approach on *time-in-classroom* for SBAE teachers. To provide context for our research, we will address the most recent efforts to discuss teacher experience and teacher effectiveness, and share recent attempts to quantify this demographic characteristic of SBAE teachers.

Workplace experience

Understanding and measuring work experience is critical toward selection (Ash & Levine, 1985), training (Ford et al., 1992) and career development (Quiñones et al., 1985) across professions. Evaluating an applicant's training and experience can be key to selecting the preferred candidate. Once selected, it is expected an employee entering a job with a specific skillset, garnered through experience, will need less training for the job. In addition, the transfer of technical skills to the job can make a difference in team success, cognitive ability, and employee self-efficacy (Ford et al. 1992). Schmidt et al., (1986) suggest as an individual's job experience increases, their ability to gain new, applicable skills increases as well.

Broadly, workplace experience research grounds itself in personnel psychology, and is most frequently defined as the number of months in the job or tenure (Ford et al., 1991). This expansive definition caused researchers to question if time is the most effective measure of work experience. We recognize, however, the prevalence of time as a measure of workplace experience. Schmidt et al. (1986) found a positive relationship between job experience and work performance as an indicator of work experience. Others quantified work experience by counting the number of

times a specific task was performed (Lance et al., 1989) and the lessons learned from different experiences (McCall et al.,1988). Across professions, we note a discrepancy in the definition to measure experience.

Schmidt et al. (1986) identified the relationship between job, time, and work experience. Using a path analysis, Schmidt et al. (1986) found job experience (time) had a causal influence on work sample performance. The study presented compelling evidence of job experience increasing job knowledge (Schmidt et al., 1986). Using samples of employee work, Schmidt et al. (1986) analyzed the effect of job knowledge based on years of experience. Indirectly, improved job knowledge in areas such as learning new skills, techniques, methods, and others, influenced work sample performance. Consistent with the Schmidt et al. (1986) results, McDaniel et al., (1988) also found a positive correlation between job experience and job performance. While these positive correlations lend credence to a focus on job experience, we must further clarify the connection between experience and workforce retention.

Given the connection between time on the job and knowledge gained, retaining knowledgeable individuals to a profession is a reasonable next step. Researchers have studied three areas contributing to the experience of work: attainment of values, attitudes, and mood (George & Jones, 1996). George and Jones (1996) concluded the relationship between job satisfaction and turnover intentions was strongest when values were not attained, and positive mood was high. For example, if an employee who is generally in a positive mood is not satisfied in their job and does not feel valued, they will likely seek action in changing their work situation. Thus, given the context of experience as a common workforce measure of attainment, we shift focus to situate teachers in workplace experience.

Teacher Experience

Ingersoll et al., (2014) identified seven trends in the United States teaching force, simply identified as, "larger, grayer, greener, more female, more diverse, consistent in academic ability, and less stable." The "larger" trend saw a 46.4% increase in employed teachers, despite only a 19.4% increase in student enrollment in the nation's schools. This increase accounted for the teacher experience demographic in the United States: 1987-2008 marked a significant influx of teachers with less experience (Ingersoll et al., 2014). A "graying" teaching force gave way to a "greener" teaching force in the span of twenty years. The average teacher, at age 41 in 1987-88, ages to a "grayer" 55-year-old twenty years later in 2007-08. This prompted a substantial exodus through fortuitous retirement at the start of the Great Recession and ushered in a teaching force with a modal age of 30 by 2011-2012.

However, as the teaching population aged, years of teaching experience decreased. In 1987-88, about 37% of teachers had fewer than ten years of teaching experience, but that demographic doubled by 2007-08 (50%), and subsequently leveled to 45% by 2011-12. Ingersoll, et al. (2014) noted this trend brought the benefit of fresh ideas, but the negative implications of a younger teaching force may far outweigh the positives. Teacher experience allows for improved instructional effectiveness, but also allows teachers to develop in other attributes of their career: dealing with behavioral issues, teaching diverse populations, working with parents, developing students' work habits, and nurturing students' self-esteem (Ingersoll et al., 2014). In addition, a younger teaching population indicates fewer experienced educators available to mentor the incoming generation of teachers (Ingersoll et al., 2014).

Preliminary work regarding teacher experience identified teaching experience as essential to teachers' sense of efficacy (Wolters & Daugherty, 2007). Wolters and Daugherty (2007) summarized the discrepancies between expert teachers and their less experienced peers to include areas of pedagogical content knowledge, classroom management skills, problem solving, decision-making, sensitivity to classroom events, mastery of content, attitudes regarding students, and

different classroom behavior. In summarizing these characteristics, Wolters and Daugherty (2007) connected these aspects to greater teacher effectiveness. Most specifically, Wolters and Daugherty (2007) found significance (despite a modest effect) in years of experience relative to teachers' confidence in employing assessment strategies and avoiding disruptions to instruction.

Papay and Kraft (2014, p. 2) poignantly present, "even if teachers do improve with experience, we can find flat returns to experience in the cross-section if the most effective teachers leave." They particularly draw on the work of Harris & Sass (2011) and Wiswall (2013) to provide a richer picture of teacher effectiveness by discussing the extent of later-career returns to experience. Papay and Kraft (2014) define *returns to experience* as characteristics gained over time in the classroom. They imply a continuous estimated return as teachers gain experience, across multiple statistical models (Papay & Kraft, 2014). Their "estimates of returns to experience that teachers accrue after five years on the job are comparable or even larger than these teacher characteristics commonly used in the teacher hiring process" (Papay & Kraft, 2014, p. 28). The crux of the issue being this: teachers continue to benefit from their experience on the job, well into their later career.

Ladd and Sorensen (2017) argue for large returns to experience for middle school teachers, particularly extending the conversation beyond test scores and early-career teaching. They give particular focus to non-test score outcomes for students including absences, reported disruptive classroom offenses, time spent completing homework, and time spent reading for pleasure. Ladd and Sorensen (2017) argue, while functions of home environment, these behaviors are also reflective of learned motivation, perseverance, and self-control, specifically generated by more experienced teachers. Furthermore, they draw on Berliner (2001) to note the characteristics of expert effective teachers include the ability to recognize patterns, complexities in student responses, flexibility in practice, and an adaptable repertoire of skills (Ladd & Sorensen, 2017).

Kini and Podolsky (2016) continued the conversation through a review of research regarding teacher experience relative to teacher effectiveness. Their executive summary details four key outcomes of teacher experience. First, teaching experience is positively associated with student achievement gains throughout a teacher's career, noting an initial peak during early-career experience with continued gains well into the third decade of practice. In addition, students of more experienced teachers demonstrate greater levels of competency on standardized tests and higher rates of school attendance. Third, teachers' effectiveness increases at a greater rate when they feel supported in their work and as they accumulate experience in a grade level, subject area, or school district. Finally, the stability of increased teacher experience affords the support of greater student learning for fellow teachers (Kini & Podolsky, 2016). Among their recommendations, Kini and Podolsky (2016) called for career development opportunities for expert teachers to retain them to the classroom, and for induction for all novice teachers. These recommendations recognize both the challenge of the demographic shift in education and the diversity of recommendations necessary to address multiple sides of the issue.

Finally, in light of these returns to experience, we examine the most recent quantification of teacher experience in the United States. The 2012-2013 NCES teacher census identifies 12% of the United States teaching population (n = 3,377,900) at 1-3 years of experience, 27% at 4-9 years, 36% at 10-19, and 25% at twenty or more years of experience (Goldring et al., 2014). However, we recognize the lack of data specific to secondary SBAE and the need to explore further this subset of the larger population relative to the interests of professional organizations and their research priorities.

SBAE Teacher Experience

While data is attainable in agricultural education regarding the experience demographic of teachers, little has compiled, analyzed, and reported years of SBAE teacher experience. Haddad et

al. (2018) examined teacher experience in Region I of the NAAE and found 27% of SBAE teachers had 1-3 years' experience, 28% had 4-9 years, 27% had 10-19 years, and only 18% of the Region I population had more than 20 years of experience. While efforts regarding recruitment and retention receive significant attention in SBAE, the lack of existing data suggests stepping back to examine the experience demographic of secondary SBAE allows greater purpose and intention in research and support efforts. A better understanding of the experience demographic in secondary SBAE will enhance the profession's ability to retain experienced teachers and thus increase teacher effectiveness.

Conceptual Framework

Early accountings of the teacher experience demographic provide a small piece of the big picture. Research suggests, as teachers gain additional experience, they gain effectiveness in pedagogical skill, classroom management, and student relations (Wolters & Daugherty, 2007). SBAE teachers accumulate fewer years' experience compared to the national teaching average (53% with fewer than ten years' experience, (Haddad et al., 2018)). Scant research exists to describe the loss when teachers are not retained. Given experience is most commonly purported as job tenure, we offer a starting point for the discussion of teacher experience.

Quiñones et al. (1995) created a conceptual framework of work experience measures (Figure 1) through a meta-analysis examining the most frequently used measures of work experience. Their findings suggested *level of specificity* and *measurement mode* to address work experience beyond a factor of time and task. To aggregate workplace experience they mapped *level of specificity* against *measurement mode*, resulting in nine measures used to assess work experience. *Level of specificity* refers to three areas: *organization*, (e.g. serving as committee chair of a national association) *job*, (e.g. teaching school-based agriculture education) and *task* (e.g. teaching plant grafting). *Specificity* compares against three modes of measurement: *amount*, (e.g. the number of memberships in national organizations) *time*, (e.g. years teaching in SBAE) and *type* (e.g. teaching a senior level Plant Science class).

Figure 1

A Conceptual Framework of Work Experience Measures (Quiñones et al., 1995)

Level of Specificity	AMOUNT	TIME	TYPE
ORGANIZATION	Number of organizations	Organization tenure/seniority	Type of organization (e.g. R&D, public)
JOB	# job or aggregate # of tasks	Job tenure/seniority	Job complexity
TASK	# times performing task	Time on task	Task difficulty, complexity, criticality

Measurement Mode

While the scope of our study focuses on job seniority and tenure, additional research and conversation is already underway and necessary to identify the relation of the other components of the matrix. However, we propose items related to *organization*, *task*, *amount*, and *type* as better illumined once we outline the context of *job tenure*/*seniority* of SBAE teachers in the United States.

Methodology

Population & Sample

We used data collected by State FFA Staff and Departments of Education, as reported to FFA Local Program Success (LPS) Team Specialists, in all six NAAE regions across the United States. While the data collection method varied by state, most teachers self-reported to their respective state specialist. Our data included current SBAE practitioners during the 2017-18 school year. While we did not suspect it would be any more difficult to accumulate experience in one region over another, we thought it worth utilizing descriptive statistics to move toward a better understanding regarding teacher experience in secondary SBAE by region. This comparison is not competitive, but rather a statistical picture of SBAE teaching experience across the United States.

Data were collected from 13,627 SBAE teachers across the six regions in the United States. We note, while robust, this sample does not account for the full population of SBAE teachers and is not census data. Puerto Rico and the Virgin Islands were not included in the study as they are not included in NAAE membership. Requirements for reporting years of teacher experience varied by state and ranged from an optional data point, required data point, or required and reviewed data point (email correspondence, Meyer, November, 2018).

Thirty-one percent of teachers (n = 4,239) did not report their years of experience or had zero years of teaching experience, leaving 9,387 valid data points (68.8% response rate). This sample bears close similarity in sample size to the current SBAE Supply and Demand Study (Smith et al., 2018) as an available point of sample comparison. Table 1 provides the number of teachers reporting in each region, and the percent of the final sample comprised by each region.

Table 1

Number Of Teachers Reporting In Each NAAE Region

	Frequency (n)	Percent (%)
Region I	1,908	20.3
Region II	1,382	14.7
Region III	1,267	13.5
Region IV	1,846	19.7
Region V	1,856	19.8
Region VI	1,128	12.0

Due to non-reporting, the apparent even distribution between regions is not an accurate representation of the current population of SBAE teachers. Region III shows the greatest discrepancy as it contains 20% (n = 4,204) of the 13,627 national SBAE teachers. Given the disproportionate number of non-respondents in Region III, we recognize the discrepancy between total teachers in Region III (n = 4,204) and number of respondents (n = 1,382) as a limitation of our study.

Check for Nonresponse Bias

We identified four states not requiring their teachers to report this data point. Teachers self-reporting their years of teaching experience yielded a 69% response rate from the total population of United States SBAE teachers. We requested data from four non-reporting states (state FFA

associations and state agriculture teachers' associations) three times but received minimal to no response from non-reporting states, or received non-aggregate data that did not align with the study. We attempted a non-response bias check from one late-responding state sharing non-aggregate data (n = 281, 7% of non-respondents, 3% total dataset). By re-aggregating the national SBAE dataset in increments of five years to match the non-reporting state's aggregation, we mirrored the late-responding state's data rather than the NCES breakdown for teacher experience. We performed an "n-1" Chi-squared analysis to evaluate the statistical difference between the SBAE sample including "zero-year" teachers (n_2 = 10,073) and the late-reporting state (n_3 = 281) (Campbell, 2007; Richardson, 2011). Since the late-responding state included zero years of experience in their aggregation and reporting, this re-aggregation of the national SBAE teacher data yields a different sample size (n_2). This model was rendered using MedCalc.

Any significant statistical difference between the samples (n_2 and n_3) is likely a result of sample size, noting a limited robustness of the n-1 Chi-squared analysis with large discrepancies in sample size (Vaske, 2008). However, a significant difference between the 6-10 ($p < 0.05$) and 20+ ($p < 0.05$) year breakdowns between the SBAE teaching sample and the late-reporting state may indicate potential for other non-reporting states to share greater accumulation of teacher experience compared to the available SBAE teacher sample. Given the difference between the late-reporting state's data aggregation and the substantial difference in sample sizes, we acknowledge the results of the n-1 Chi Squared analysis, encourage more robust efforts to secure census-type data moving forward, and proceed with the following analysis.

Data Analysis

We utilized the Statistical Package for Social Sciences (SPSS Version 25) to analyze total years teaching by region. Our study utilized an analysis of variance model (ANOVA) to evaluate any significant difference in teacher experience by NAAE Region. The ANOVA model used *total years of teaching* as the continuous, dependent variable against *NAAE region* as the categorical, independent variable (Vaske, 2008). We identified regions as independent samples of the population, noting SBAE teachers can only teach in one region, assuring no person is in more than one group (Vaske, 2008). Prior to inferential analysis to the broader population of SBAE teachers, we reviewed frequency distributions for assurance of normality as recommended by Field (2009) and Kirk (2013). Tamhane's post-hoc test accounted for unequal variance in the sample based on a significant Levene's test (p = 0.000; $p < 0.05$, *a priori*). Further, Kirk (2013) reported sample sizes greater than 12 assist with the interpretation of a robust F statistic. We met each of these criteria for the present sample and data set. In addition to descriptive statistics and the ANOVA model, an "n-1" Chi-squared analysis evaluated the difference between SBAE teacher experience and national teacher experience more broadly (Campbell, 2007 & Richardson, 2011). This model was rendered using MedCalc.

Results

Research question one sought to describe the experience demographic of SBAE teachers in the United States. Table 2 lists SBAE teacher experience categorized into experience groups aligning with NCES reporting.

Table 2

SBAE Teacher Experience

	Frequency (*n*)	Percent (%)
1-3 Years	2583	27.5
4-9 Years	2404	25.6
10-19 Years	2382	25.4
20+ Years	2018	21.5

Note. Years in teaching reported based on NCES breakdown of teacher experience reporting (Goldring et al., 2014).

We used compiled data from 13,627 SBAE teachers across the six NAAE regions in the United States. Four-thousand, two-hundred and forty teachers (31.2%) did not report years of experience, resulting in a final sample of, n = 9,387. Mean years teaching across the sample was 10.7 (SD = 9.7). Over half (53.1%) of SBAE teachers across the nation have fewer than nine years of teaching experience, with 13% of the sample having only one year of experience. Early career teachers (1-3 years) comprised 27.5% (n = 2,583) of the sample, with first year teachers being the largest subset (n = 1,227, 13.1%). All other experience groups had consistent concentrations across experience levels. Teachers with 4-9 years' experience accounted for 25.6% (n = 2,404) of the sample and 25.4% of teachers had 10-19 years of experience (n = 2382). Teachers with more than 20 years of experience comprised 21.5% (n = 2,018) of the sample.

Research question two analyzed the variation between NAAE Regions relative to years of teacher experience. While we had no reason to suspect it was more difficult to accumulate teaching experience in one region over another, this study is the first to report professional experience as a function of time in classroom. Since this data is not reported elsewhere, we offer it as a valuable accounting in this case. Table 3 lists mean years teaching experience, by region, for the reporting teachers. In addition, teacher experience data were interpreted using an analysis of variance (ANOVA) model (n = 9,387) for each NAAE Region. The means reveal the greatest levels of experience are in Region III and the least experience in Region II. The ANOVA model rendered a significant difference ($p < 0.05$) between the means of Region III and Region VI compared with the other regions. Upon analysis of the Tamhane's T2 post-hoc test, those in Region III and Region VI had significantly more teaching experience ($p < 0.05$) compared to other regions, but the strength of the significant difference between regions was minimal ($\eta = 0.07$). Therefore, there is little practical significance in the difference in accumulated experience between NAAE regions.

Table 3

Years of Teaching Experience Among NAAE Regions

	Region I	Region II	Region III	Region IV	Region V	Region VI	*F*-value	*p*-value	Eta (η) Effect size
Years Teaching Experience	10.5[a]	10.4[a]	11.8[b]	10.6[a]	10.6[a]	10.7[b]	8.290	0.000	0.07

Notes. Means on a continuous scale of years from 1-53.
Means with different letter superscripts are significant at $p < 0.05$ based on Tamhane's T2 post-hoc tests for unequal variances (i.e. [a] and [b] are significantly statistically different from each other ($p < 0.05$, $\eta = 0.07$)

Region I, (*n*=1,908, *SD*=9.43); Region II, (*n*=1,382, *SD*=9.85); Region III, (*n*=1,267, *SD*=10.56); Region IV, (*n*=1,846, *SD*=8.97); Region V, (*n*= 1,856, *SD*= 9.41); and Region VI, (*n*=1,128, *SD*=9.93).

Finally, question three sought to describe any differences between the SBAE teacher population and national teacher population by years of experience. Table 4 outlines the difference between SBAE teacher experience and national teacher experience using an "*n*-1" Chi-squared analysis.

Table 4

SBAE Teacher Experience and National Teacher Experience

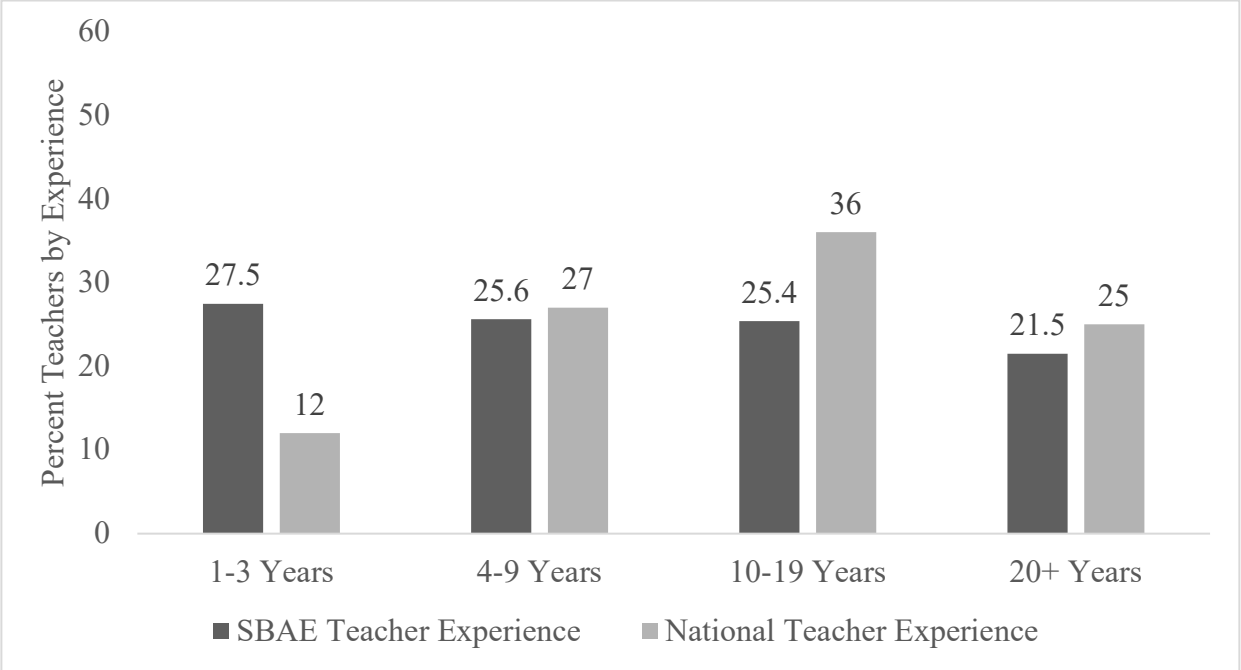
		Frequency (*n*)	Percent (%)	χ^2 value	*p*-value
1-3 Years	SBAE	2583	27.5	2123.15	< 0.001
	National	398,500	12		
4-9 Years	SBAE	2404	25.6	1.31	0.253
	National	919,500	27		
10-19 Years	SBAE	2382	25.4	456.67	< 0.001
	National	1,205,400	36		
20+ Years	SBAE	2018	21.5	61.17	< 0.001
	National	854,500	25		

Note. Years teaching reported based on NCES breakdown of teacher experience reporting (Goldring et al., 2014).

We employed an "*n*-1" Chi-squared analysis (Campbell, 2007 & Richardson, 2011) to evaluate any significant difference in the teaching experience of SBAE teachers to the national teacher demographic. The Chi-squared analysis rendered significant models ($p < 0.05$) for each comparison except for the 4-9-year teaching demographic ($p = 0.253$). Statistical significance, in this instance, provides limited information as there is a large discrepancy in sample size between the comparative samples (Vaske, 2008), thus a graphical representation (Figure 2) between the two populations gives a clearer depiction of practical significance.

Figure 2

Comparison of SBAE and National Teacher Experience



Practically speaking, there is an accrual of experience in the national teaching population compared to the SBAE teaching population. This is evident in the gradual increase in teachers as years of teaching and categorical span increase for teachers nationally. However, we see relatively flat experience across the SBAE teaching force. This prompts several questions and implications moving forward.

Conclusions

Our study is the first of its kind to quantify the SBAE teacher experience demographic in the United States. While this study lends a starting point to reporting and discussing the experience demographic of SBAE teachers, 31% of teachers (n = 4,239) did not report their years of experience or had zero years of teaching experience. As such, additional efforts are necessary to increase the scope of data collection. Currently, teacher experience data are collected using a variety of methods (Meyer, 2018), yielding an incomplete picture of the experience demographic in SBAE. The dataset does not allow us to evaluate longitudinal trends, but continued study of this demographic characteristic would permit greater clarity regarding the accumulation of experience. While the numbers provide a cursory view, the data do not allow us to make assertions regarding the effectiveness of teachers or the programs aimed at teacher retention. This study, however, provides a snapshot capturing the experience levels of SBAE teachers in the United States.

Research question one describes the teacher experience demographic for SBAE teachers in the United States. SBAE teachers have a mean teaching experience of 10.7 years (SD = 9.7), which splits nearly evenly into 1-3-year teachers (27.5%), 4-9-year teachers (25.6%), 10-19-year teachers (25.4%), and 20+ year teachers (21.5%). Of the 1-3-year teachers, almost half of this demographic has only one year of teaching experience. Again, 13.1% of the sample (n = 1,227) were teachers with one year of experience. At 13.1% of the total sample, first year teachers account for double the frequency of any other year of experience apart from second year teachers (7.7%). Over half (53.1%) of SBAE teachers across the nation have nine or fewer years of teaching experience. This means SBAE has 8% more teachers with fewer than ten years teaching experience

compared to the national teaching population (Ingersoll et al., 2014). This could be indicative of the decline in teaching experience noted by Ingersoll and colleagues (2014), with fewer mentor teachers available to induct incoming generations of teachers. However, this split could also imply an even distribution across the experience accumulation of SBAE teachers. In other words, there is no level of experience with a higher population of teachers, suggesting SBAE teachers may not be remaining in the profession as they gain teaching experience. Further analysis of teacher retention trends is necessary to provide a more complete picture. This study lends further credence to the call of Papay and Kraft (2014) to retain the most effective (experienced) teachers. With this in mind, we echo Papay and Kraft's (2014) ask: What supports are in place to retain these highly effective teachers? How do current research and support priorities reflect the value placed on experienced teachers? Is *years of experience* a valid measure of effectiveness, or does it discredit any value that should be placed on less-experienced teachers?

Our second research question sought to analyze variation in mean years of experience between NAAE Regions. Region III and Region VI displayed a significant difference compared to all other regions, but not with each other. However, the reported effect size ($\eta = 0.07$) was negligible. While NAAE Region categories do not help explain the difference in teacher experience accumulation, there are other considerations from the broader workforce literature to help understand ways of thinking about experience. Quiñones et al. (1995) suggested *level of specificity* and *measurement mode* to address work experience beyond a factor of *time* and *task*. Furthermore, Ladd and Sorenson (2017) argued for a focus on ability to recognize patterns, complexities in student responses, flexibility in practice, and an adaptable repertoire of skills as characteristics of effective teachers. In agreement with workforce development researchers, *time* and *tenure* in a job should not be the only measures of experience (Quiñones et al., 1995). Further efforts are necessary to understand *experience* beyond time in the profession. Several researchers in agricultural education have taken up this call, and we hope work continues, illuminated by this demographic research. Additional collaboration with experts in workforce development, outside of SBAE, may be necessary to examine different and additional conceptualizations of experience.

Finally, research question three sought to analyze the difference between SBAE teacher experience and the broader teaching profession in the United States. Differences in teaching experience are more pronounced between 1-3-year teachers (27.5% SBAE and 12% nationally) and 10-19 year teachers (25.4% SBAE and 36% nationally). While the teacher experience demographic is split evenly in agricultural education, there are 15.5% more 1-3-year SBAE teachers and 9.6% fewer 10-19 year teachers compared to the national teaching population. We are excited to recognize a quantitative representation of the effective recruitment occurring in SBAE, however, the available data could be indicative of another concerning trend. Namely, these data imply teachers are not being retained, particularly after year nine, relative to national trends. While a snapshot in time, we wonder: Who is available to mentor SBAE's influx of young teachers? Why is there a drop-off of SBAE teachers, compared to national data, after nine years in the classroom?

Implications

The addition of these data to the SBAE supply and demand picture allows a better image of the state of the SBAE teaching force, particularly as it relates to understanding the nuance of teacher retention. In applying Quiñones and companies' (1995) conceptual framework to our study, we recognize *time* only accounts for a fraction of the experience teachers accrue. While time is a necessary component in understanding the SBAE teaching population, it is not the only factor determining experience or effectiveness. It is imperative, for the future of the SBAE profession, work continue to develop an understanding of teacher experience as it impacts selection, training, and career development (Ash & Levine, 1985; Ford et al., 1992). We, therefore, revisit themes from our introduction to offer implications focusing on quantification and definition; career stages,

generations, and workforce development; generational trends; and retention, professional development, and interventions.

Our study lends a starting point to quantifying the workforce experience of SBAE teachers. We note, however, experience in our reporting is purely a function of years and does not account for the valuable work identifying what teachers are experiencing in the classroom and how they experience teaching. We offer the caveat that this work should move forward with a consistent definition of teacher experience, accounting for the richness of lived experience brought with individuals as they enter teaching (McCall et al., 1988). Noting the varied routes into SBAE teaching, the professional definition of experience should express value for the breadth of experience accumulated across the profession, including industry experience and informal teaching opportunities. This definition also allows greater reflexivity in considering the traditional means of discussing experience.

Twenty-five percent of the SBAE teaching force has fewer than three years of experience (and 13% have only one year of experience). Practically speaking, to move generational considerations beyond anecdote, we accounted for alternative routes to teaching (n = 356, 19.4% of new hires, Smith et al., 2018). For the most conservative estimate, we operationalized those entering by alternative routes as over the age of 38 (identified as Generation X and older, the most extreme experience to age case, Pew Research Center, 2018).Conservative estimates place approximately 52% of the current SBAE teaching force as Millennials. While we do not have data to support the age of SBAE teachers in our sample, using accepted age ranges for generations (Pew Research Center, 2018), we saw the oldest members of Generation Z entering the teaching ranks last year (2019). With five generations currently coexisting in the workforce (Premack, 2018), it is essential to account for the collision of generational trends with work expectations (Premack, 2018). Professionally, we must continue to show value for all generation's process in their work experience without demonizing the habits of one or another as less. Additional data points would allow greater clarity around generational trends. This is a worthwhile effort as we estimate the current SBAE workforce is comprised of at least 17% more Millennials (52% in SBAE) than the United States workforce (up to 35% Millennials, Wakeman, 2018).

Traditional means of discussing experience include the ideas of career stages, workforce development, and the generations identified in the workforce. By overlaying teacher career stages (White, 2008) on our reporting of teacher experience, the majority of SBAE teachers fall in the *early-career* stage (1-5 years). While programs exist on the national, regional, and state levels, perhaps additional accommodations must be made on a more local (i.e. school district) level to address how early-career teachers process their survival, the tasks of teaching, and their impact on students (White, 2008). Attention to the teaching career relative to the generational value of the workplace ties directly to a more holistic approach to SBAE workforce development. Greater clarity allows expressed value of experience and accounts for the concerns of teachers across their teaching life cycle. Furthermore, connecting experience and concerns to generational trends seen in the broader workforce may enable an expedited process of finding ways to value experience across the profession.

Recommendations

We offered implications of quantification and definition, common measures of career experience, and generational trends. We conclude with recommendations for agricultural education research, teacher preparation, and practicing SBAE teachers. Given the purely numerical reporting of our data, it is essential agricultural education research continue pursuing questions of recruitment, retention, and motivations. With 53% of the SBAE profession at fewer than nine years of experience, perhaps after nine years, teachers apply their experience in other professions instead. This also holds implications for supporting mid-career teachers (White, 2008). In addition, the

profession must consider and outline measures of teaching experience. With various routes to certification (National Teach Ag Campaign, 2018), the profession must move beyond experience as time and analyze experience in the secondary classroom through qualitative and other methods. We strongly suggest additional data be collected to account for the nuance the experience demographic and age offers to our quantification of SBAE teacher supply and demand.

Teacher preparation programs must continue evaluating their recruitment and preparation efforts. With 13% of SBAE teachers having one year of experience, a need exists to assess how this demographic applies their preparation, particularly in year one. Despite steady net numbers in the overall SBAE teacher population (National Teach Ag Campaign, 2018); we draw attention to the six percent drop in teachers between years one and two in our study. This discrepancy suggests continued research to explore the SBAE experience demographic in terms of both recruitment and retention. Our research raises currently unanswered questions regarding how teacher preparation programs can support career development planning as teachers enter the profession. What additional resources should induction programs provide toward retaining teachers after the first year? What other stakeholders must be engaged in long-term efforts to extend experience in the SBAE teaching force?

For the practitioner, our study warrants an essential look beyond agricultural education to broader workforce trends. If the experience demographic is reflective of age (accounting for first year, alternatively certified teachers) over half of the SBAE workforce could be categorized as Millennials. With Millennials being a job-hopping generation (Premack, 2018), additional research must uncover the time intervals at which Millennials "hop" from teaching to another profession. If they job-hop, how does that affect the future of education programs? In addition, how is SBAE accommodating those who job-hop into agricultural education? Is there a route into teaching as accessible as the route out?

The longer a person stays in a career, the more their work performance increases (Schmidt et al., 1986). In the same vein, teaching experience improves instructional effectiveness (Ingersoll et al., 2014). In the context of teaching, this could yield increased skill in several aforementioned areas, including:

- Ability to deal with behavioral issues, teach diverse populations, work with parents, develop students' work habits, nurture students' self-esteem (Ingersoll et al., 2014)
- Ability to recognize patterns, elicit complexities in student responses, show flexibility in practice, and develop an adaptable repertoire of skills (Ladd & Sorensen, 2017)
- Develop pedagogical content knowledge, classroom management skills, problem solving, and decision-making (Wolters & Daugherty, 2007)
- Develop sensitivities to classroom events, content mastery, attitudes regarding students, and variations in classroom behavior (Wolters & Daugherty, 2007)

If SBAE teachers are leaving before they establish these skills effectively, how will this impact education as a whole? For SBAE, continued focus on the retention of the 53% of teachers with fewer than nine years' experience may foster continued development of these skills and more effective SBAE programs. We echo Kini and Podolsky (2016) in recommending continued career development opportunities to retain expert teachers and induct novice teachers.

In summary, it is essential the profession pay attention to the work preferences of younger generations. This includes recognizing up to five generations currently co-existing in any workplace (Wakeman, 2018). Openness to future potential and adaptive accountability is key to effective management of younger generations (Wakeman, 2018) that may not be readily occurring in the secondary classroom. However, this study did not evaluate the age of the SBAE teaching

force, and therefore, the generational divide should be only one of the considerations given for the profession. In SBAE, several routes to certification exist (National Teach Ag Campaign, 2018); bringing a necessary call to evaluate how experience is measured and valued for the SBAE profession. As we seek to sustain SBAE, through research and programmatic support, the profession must find creative ways to retain experienced teachers and further develop the support mechanisms and structures enabling teachers to thrive.

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