Journal of Agricultural Education,
56(2), 93-109. doi: 10.5032/jae.2015.02093

How Time Allocation Impacts Teacher Efficacy of Student Teaching Interns in Agricultural Education: A Q-sort Study

Sheyenne Krysher[1], J. Shane Robinson[2], and M. Craig Edwards[3]

Abstract

Several studies in agricultural education have assessed teacher self-efficacy of novice, first-year, and veteran teachers. Likewise, numerous studies have assessed the time students spend at their cooperating centers. However, a need existed to understand the influence of time allocation on teacher self-efficacy in a way that enabled human subjectivity to be considered, i.e., Q-methodology. The study found that three intern views existed at Oklahoma State University in agricultural education: Self-Assured Teachers, Determined Teachers, and Emerging Teachers. The Self-Assured Teachers spent the most amount of time teaching when compared to the other two views. Determined Teachers spent the most amount of time observing, and Emerging Teachers spent the most amount of time in school. The findings have implications for student teacher placements in cooperating centers and pre-service teachers' early field-based experiences in agricultural education.

Keywords: efficacy; Q-sorts; student teacher interns; time allocation

The shortage of agricultural education teachers is a longstanding concern of the profession (Kantrovich, 2007). Attempts to retain teachers in secondary agricultural education programs are an ongoing problem (Tippens, Ricketts, Morgan, Navarro, & Flanders, 2013). Part of the reason for the prevalent shortage is because of a lack of retention due to high stress and burnout associated with performing the various facets of the job (Croom, 2003; Lawver & Smith, 2014). Compounding the problem is the fact that additional work demands continue to be placed on agricultural education teachers (Roberts & Dyer, 2004b). Clark, Kelsey, and Brown (2014) found that "approximately 50% of agriculture teachers leave within the first six years of teaching" (p. 43). Therefore, monitoring the responsibilities student teachers undertake, the time they devote to completing such, and how that impacts their efficacy for becoming an inservice secondary agriculture teacher is imperative.

The growing number of job responsibilities that a secondary agricultural education teacher is expected to perform requires substantial commitments of time (Robinson, Krysher, Haynes, & Edwards, 2010). Specifically, agricultural education teachers spend their time in numerous activities both in and out of the classroom ranging from teaching, advising, and supervising to being an active member in their communities (Roberts & Dyer, 2004b; Torres & Ulmer, 2007). In a study regarding where student teachers spent their time, it was determined

[1] Sheyenne Krysher is the Distance Education Coordinator for the Department of Agricutlural Sciences and Engineering Technology at Sam Houston State University, Thomason 203, Huntsville, TX 77341, krysher@shsu.edu

[2] J. Shane Robinson is an Associate Professor of Agricultural Education in the Department of Agricultural Education, Communications and Leadership and the Associate Director of the Institute for Teaching and Learning Excellence (ITLE) at Oklahoma State University, 100 ITLE, Stillwater, OK 74078, shane.robinson@okstate.edu

[3] M. Craig Edwards is a Professor of Agricultural Education in the Department of Agricultural Education, Communications and Leadership at Oklahoma State University, 448 Agricultural Hall, Stillwater, OK 74078, craig.edwards@okstate.edu

that those who student taught in the fall semester spent statistically more time in school and observing their cooperator than did their spring counterparts (Robinson et al., 2010). However, the same study indicated that student teachers in the spring semester spent statistically more time supervising SAEs per week than did student teachers who interned in the fall (Robinson et al., 2010).

The experiences student teachers have while interning at a cooperating center is intended to prepare them for the activities performed by full-time agricultural education teachers. But do they? It is assumed that the more time an individual devotes to performing a particular activity, the higher that person's self-efficacy and competence should be regarding that task (Bandura, 1986; 1997). Yet, regarding time spent, the question of *activity* versus *productivity* should be considered. In other words, are student interns spending their time productively, or are they just being active, and what impact does that have on their perceived abilities to become effective teachers?

Literature Review

In general, individuals form opinions about themselves, i.e., self-efficacy, by reflecting on their experiences (Bandura, 1986, 1997). Therefore, self-efficacy may be affected by the amount of time a student teacher spends engaged in activities during the student teaching internship. In addition, self-efficacy is a construct in the professional preparation of student teachers. Higher self-efficacy during the student teaching internship increases the interns' overall performance (Tschannen-Moran, Hoy, & Hoy, 1998). Improvements, however, can be made in the teacher preparation process to assist interns in acquiring strong efficacy beliefs earlier in their professional careers.

Multiple studies within the teacher education profession of agricultural education have been conducted to understand the teacher self-efficacy of student, novice, and experienced teachers (Burris, McLaughlin, McCulloch, Brashears, & Fraze, 2010; Knobloch, 2006; Roberts, Briers, & Harlin, 2008; Roberts, Harlin, & Ricketts, 2006; Stripling, Ricketts, Roberts, & Harlin, 2008; Whittington, McConnell, & Knobloch, 2006). Teacher self-efficacy in agricultural education also has been investigated highlighting different variables, such as communications (Edgar, Roberts, & Murphy, 2009), gender bias (Kelsey, 2007), personality type (Roberts, Mowen, Edgar, Harlin, & Briers, 2007), student teaching experience (Knobloch & Whittington, 2002), comfort level while teaching prescribed instructional objectives (Wingenbach, White, Degenhart, Pannkuk, & Kujawski, 2007), job satisfaction (Blackburn & Robinson, 2008), and career commitment (Knobloch & Whittington, 2003).

Teaching agriculture requires instruction, advising, and supervision across a variety of experiences (Baker, Robinson, & Kolb, 2012), which forces teachers to perform numerous job responsibilities (Delnero & Montgomery, 2001; Robinson, 2010). Specifically, numerous activities both in and outside of the classroom, such as instructional preparation and management, grading student work, administrative duties, in-service participation, management of the FFA program, Supervised Agricultural Experience (SAE) observations, and preparation for competitions, are conducted by agricultural education teachers (Torres, Ulmer, & Aschenbrener, 2008).

Numerous studies have been conducted regarding the allocation of time within a secondary agricultural education program. Torres and Ulmer (2007) analyzed the time student teachers spent conducting various job responsibilities while at their cooperating centers. They found that most of the student teachers' time allocations were spent in teaching-related activities (10.80 hours), followed by planning (8.44 hours), teaching (8.19 hours), observation (2.73 hours), and administrative activities (2.05 hours). Likewise, Nekolny and Buttles (2007) analyzed the time allocation of agricultural education student teachers during spring and fall semesters at the University of Wisconsin-River Falls from 2003 to 2006. Similar to Torres and Ulmer (2007),

they found that student teachers spent more time teaching than observing. In addition, they detected that their spring student teachers taught more and observed more than the fall student teachers.

In 2008, at the University of Missouri, Torres et al. (2008) compared the time allocations of student teachers, novice teachers, and experienced teachers among 11 teaching activities: preparation for instruction, classroom/laboratory teaching, laboratory preparation/maintenance, grading/scoring student work, administrative duties, professional activities, SAE observation and recording, local FFA activities, non-local FFA activities, career development events (CDEs) preparation, and adult education. Observation times were only recorded for student teachers, because observation was not a factor in the novice and experienced teacher populations. The researchers found that all levels of teachers spent the majority of their time in instruction. Students and novices spent their second largest amount of time expenditure in preparation; whereas, the experienced teachers spent their second largest portion of time on CDE preparation.

Lambert, Henry, and Tummons (2011) conducted a qualitative study of early career agricultural teachers, defined as those in their first six years in the profession in Missouri and North Carolina, on how they spent their time and the potential effects time had on their levels of stress. Five patterns emerged: 1) the day consists of patterns that vary depending on the time of the year; 2) a conscious allocation of work time occurred; 3) the process of managing time is an adapting and evolving process; 4) personal and social time for the teacher is woven into or around work; and 5) tensions exist between the actual and ideal ways teachers spend their time. The researchers also found that teachers seemed to have allocated their time purposefully, segments of time were patterned throughout the day and year, and external stressors were found to create changes in how teachers patterned or segmented their days.

Another study on time allocation in agricultural education compared student teachers, both spring and fall semesters, over a three-year period (Robinson et al., 2010). This study found that fall student teachers spent more time in teaching and observation than their spring semester counterparts. Spring student teachers spent more time conducting out-of-school activities, such as FFA activities, CDE, and livestock competitions, which traditionally occurred during the spring (Robinson et al., 2010).

In their study of novice agricultural education teachers, Whittington et al. (2006) recommended that teacher efficacy research be conducted in relation to student teachers in all fields, including agricultural education. This study, therefore, sought to understand more about student teachers' allocation of time to various teaching activities during the student teaching internship and how it may affect the participants' perceptions of their teaching abilities, i.e., professional self-efficacy.

Theoretical Framework

Over several decades, Albert Bandura developed and refined his work on self-efficacy. Through his development, four sources of influence emerged that support a strong sense of self-efficacy: mastery experiences, vicarious experiences, social persuasion, and physiological and emotional state (Bandura, 1977, 1986, 1997).

Mastery Experiences

Mastery experiences are the most influential sources of positive self-efficacy beliefs (Bandura, 1986, 1997). Although mastery experiences are influential in teaching efficacy, the physiological arousal associated directly with those experiences has an important effect, as well (Tschannen-Moran et al., 1998). The combination of both is a process that builds on positive experiences (i.e., a student performing well on a test). "Enactive mastery experiences are the most influential source of efficacy information because they provide the most authentic evidence

of whether one can muster whatever it takes to succeed" (Bandura, 1997, p. 80). Stronger efficacy beliefs arise from repeated successes or failures. However, if the experience is easy, producing quick success, a person may become discouraged by failure when attempting a more complicated task. Bandura (1997) explained that a useful purpose in persisting through tough times exists; i.e., stronger efficacy can emerge from adversity and struggle. As a person strives to overcome obstacles to succeed at a task, increased levels of perseverance are created. Efficacy beliefs, once set, tend to remain fixed over time in more experienced teachers (Ross, 1994).

Vicarious Experience

Though mastery experiences are the most influential sources of efficacy, vicarious experiences also play a vital role. Vicarious experiences are those in which an individual observes someone else perform a task. Models of successful teaching form the foundation for another to judge whether the teaching task is manageable and replicable (Tschannen-Moran et al., 1998). This is especially important to beginning teachers who form the notions of self-efficacy by believing they have the ability to be successful teachers under similar circumstances (Bandura, 1977, 1986). "Seeing or visualizing people similar to oneself perform successfully typically raises efficacy beliefs in observers that they themselves possess the capabilities to master comparable activities" (Bandura, 1997, p. 87). To that end, the vicarious experience(s) attained through others serves as a modeling effect. In addition, modeling serves as a social barometer in which to judge a person's own accomplishments when no established criterion for success exists. Models can also serve as inspiration because people seek models who demonstrate knowledge and skills and other capabilities to which they aspire.

Social Persuasion

People can develop efficacy beliefs based on feedback or verbal influence received from others. Social persuasion involves the formation of efficacy beliefs through others' suggestions about a person's performance. "If people are persuaded that they have what it takes to succeed, they exert more effort than if they harbor self-doubts and dwell on personal deficiencies when problems arise" (Bandura, 2004, p. 622). The degree of persuasion also affects how people internalize praise. Insincere praise does not have a lasting effect on self-efficacy; whereas, constructive and valid accolades may build self-efficacy. In addition, negative feedback tends to weaken efficacy beliefs more quickly than positive feedback can build it (Bandura, 1997).

Physiological and Emotional State

Physiological and emotional arousal is also a factor in teacher efficacy. Emotions are a double-edged sword and individualistic in increasing or inhibiting a person's self-efficacy. Some individuals perform best when they are relaxed and self-assured in the anticipation of future success (Bandura, 1997). Moderate levels of arousal or nervousness can increase heart rate and cause sweating for some individuals, but, in the case of others, it may improve their performance by focusing attention and energy on a task; however, high levels of arousal may impair the function and performance of some people (Tschannen-Moran et al., 1998). The judgment of a person's efficacy also may rely on his or her emotional or physical state. High states of emotional arousal, such as stress, fear, and anxiety may influence a person's vulnerability, thereby lowering the appraisal of efficacy. Similarly, a person's efficacy beliefs may diminish as he or she experiences fatigue or pain from physical activities (Bandura, 1997).

All four sources of efficacy "contribute both to the analysis of the teaching task and to self-perceptions of teaching competence, but in different ways" (Tschannen-Moran et al., 1998,

pp. 228-229). The four abovementioned sources shape an intern's perceptions of self-efficacy based on interplay between the internal and external factors that permeate the act of teaching.

Because self-efficacy may become increasingly resistant to change over time (Tschannen-Moran et al., 1998), the early professional development of the student teacher becomes more important. Though mastery experiences are the most influential overall (Bandura, 1997), vicarious experiences may be the most influential during student teaching (Mulholland & Wallace, 2001). Moreover, due to the daily amount of contact with a student teacher, cooperating teachers start to influence a student teacher's efficacy more than a college supervisor (Borko & Mayfield, 1995; Byler & Byler, 1984), especially through verbal persuasion and modeling (Knoblauch & Woolfolk Hoy, 2008). Using Bandura's (1977, 1986, 1997) *influences of self-efficacy* as a prism, it was posited that how the participants used their time during student teaching would reveal the experiences or *sources* on which they based their subjective views of themselves as teachers. The study's findings were interpreted through this theoretical lens.

Purpose of the Study

The purpose of this study was to describe the amount of time interns spent performing various activities during the student teaching internship that were likely to inform their views on teaching ability. These activities included teaching in classroom and laboratory settings, observing other teachers, instructing on specific curricula, and time spent in alternate settings while at their cooperating centers. The specific research question that guided the study was, "How did the amount of time spent in the various activities experienced during student teaching inform the interns' views on their teaching ability?"

Methods and Procedures

The participants for this study consisted of 28 student interns in agricultural education at Oklahoma State University during the Spring 2009 and Fall 2009 academic semesters. Each intern was a former participant of a Q-methodological study, which sought to capture the self-reported, subjective views interns held about their teaching ability during the student teaching internship (Krysher, Robinson, Montgomery, & Edwards, 2012). The Q-methodology, developed in the 1930s by William Stephenson, is a research method used to evaluate human subjectivity through self-reported sorts, known as Q-sorts (Danielson, 2009). Essentially, participants are provided a list of statements, which they sort into three distinct categories: *most like me*, *most unlike me*, and *neutral*. This sorting process allows participants to rank-order the items regarding their self-perceived viewpoints on that topic (McKeown & Thomas, 1988). After the categories are set, participants place the statements onto a form board ranging from +4 to -4. Once all statements are sorted onto the form board, the data are entered into PQMethod (Schmolck, 2014) for analysis. The PQMethod uses a correlation matrix, which is factor analyzed to determine the best solution for the data. Thereafter, the factors are named based on the theme that emerges regarding their loading capacity as per the principal component analysis (PCA) procedure (Schmolck, 2014).

Researchers have suggested that employing a variety of research methods, including qualitative inquiry, would serve to enrich the understanding of teacher efficacy (Henson, 2002; Tschannen-Moran et al., 1998). However, the measurement of efficacy has been conducted through instruments which were, often times, too broad or too narrow (Krysher, 2012). Instead, the measure of self-efficacy through the application of Q-methodology, a research method designed to study human subjectivity, was used for this inquiry. Q-methodology is a qualitative research method with quantitative features (Watts & Stenner, 2003, 2005), which could serve to study teacher efficacy through ways that have been overlooked previously. It has been recommended that "self-efficacy beliefs should be assessed at the optimal level of specificity that

corresponds to the task being assessed and the domain of functioning being analyzed" (Pajares, 1996, p. 547). Q-method seeks to interrogate a phenomenon holistically.

> If value preferences are at issue, the most sensible and straightforward strategy is to ask a person to provide a synthetic picture of what his value preferences are, and one crude way of doing this is to instruct him to model his preferences in a Q sort. (Brown, 1980, p. 53)

Thus, the use of Q-methodology could allow for a subjective examination of self-efficacy by which both the task and domain analyzed are evident to the person completing the Q-sort.

To study how agricultural education interns spent their time during the work day, data were collected for each participant who performed a Q-sort. As part of a course requirement for the student teaching internship, all agricultural education interns at Oklahoma State University completed reports, which were submitted weekly for each of the 12 weeks of the student teaching internship. The interns self-reported how their time was allocated throughout the day in various activities such as teaching, observing, supervising SAEs, and advising FFA activities. All reports were submitted weekly via electronic mail and archived in a departmental database.

The weekly reports were retrieved from the archived database after the study's participants completed their Q-sorts. Data were recorded from a total of 336 weekly reports, 12 reports from each of the 28 Q-sort participants. A Microsoft Office Excel spreadsheet was used to record and analyze the data which consisted of time spent teaching in a classroom setting, teaching in a laboratory setting, instructing specific curriculum, observing, and advising students in settings outside of the school or classroom, including intra- and co-curricular events during school hours. Descriptive statistics were used to analyze the data.

In Oklahoma, the length of class periods can vary from school to school. Class periods ranged from 45 to 85 minutes. To be consistent with earlier research studies and facilitate interpretation of the data, one hour was recorded for each class period regardless of the actual length of the class periods (Robinson et al., 2010). The researchers recognize this as a limitation of the study. Further, the time spent in alternate settings outside of the school or classroom consisted of interns attending activities such as livestock exhibitions, CDEs, leadership camps/conventions or other FFA activities. Time spent in alternate settings was recorded only if the activities involved the intern acting in a teacher role, i.e., supervision of secondary school students. Time was not recorded if the intern was completing assignments required for the university, such as mock interviews or observational visits to other schools.

This manuscript is part of a larger data set that included a study of how student teaching interns viewed their teaching ability during a 12-week student teaching experience (Krysher et al., 2012). Time allocation data were grouped by factor after the final solution for the factor analysis was accepted, and the defining Q-sorts were identified. All time allocation data for the participants' Q-sorts were analyzed using means and standard deviations. After conducting the factor analysis, three distinct views or factors of teachers were identified. These three views were named *Emerging Teacher* (12), *Self-Assured Teacher* (5), and *Determined Teacher* (4) (Krysher et al., 2012). The Q-sorts of interns who were either confounded (4) or non-significant (3) were not used in the time analysis because their Q-sort load did not help to define any of the views. The *Emerging Teacher*s were those student teaching interns who recognized they still needed growth and development toward becoming a professional. Their Q-sorts indicated that they sensed their future as a teacher was on the right track, but their confidence as a teacher was somewhat shaky or uncertain. These interns recognized much room for growth existed before they could consider themselves effective teachers. Interns holding the *Self-Assured Teacher* view were comfortable and confident in their teaching ability. Unlike the *Emerging Teachers*, the *Self-Assured Teachers* already considered themselves to be effective teachers. They perceived a degree of smugness or arrogance about their abilities to perform as teachers and were less apt to accept criticism or suggestions. The *Determined Teacher*s consisted of interns who perceived teaching to be a balance of confidence coupled with hard work regarding effective teaching and

learning. Similar to the *Emerging Teachers*, they realized their skills were still developing. However, unlike the *Self-Assured Teachers*, they had a willingness to improve their skill set by working hard and being a lifelong learner. As such, they were more open to try new things and to learn from others. Therefore, this manuscript used the three views that emerged in the larger study (Krysher et al., 2012) to describe the student teaching interns' allocation of time across various activities according to the three teacher views described.

Findings and Results

Twenty-eight agricultural education interns, consisting of 16 males and 12 females, completed a Q-sort (see Table 1). The students ranged in ages from 21 to 33, with a mean age of 22.5 years. Twenty-seven of the 28 participants were within the age range of 21 to 24. The cooperating center's locations were reported by the interns as either rural or suburban: 21 interns self-identified their cooperating center as rural, and seven self-identified their cooperating center as suburban. No intern self-reported completing their internship in a cooperating center that was in an urban setting. All of the interns self-reported enrollment in agricultural courses as high school students.

Of the 28 interns who completed a Q-sort, 21 loaded on one of three views: *emerging*, *self-assured*, and *determined teachers* (see Table 1). All of the interns expressed being prepared adequately to instruct their courses in regard to teaching methodologies or pedagogy. However, six interns did not view themselves as prepared to instruct select courses at their cooperating centers due to the curriculum content they were expected to teach.

Twelve interns held the viewpoint of *Emerging Teacher*. Of these, six were male and six were female. Eight of the interns taught in rural schools, and four taught in suburban settings. Interns who expressed the *Emerging Teacher* view ranged in age from 21 to 23 years, with an average age of 22 years. Regarding content, nine *Emerging Teachers* perceived they were prepared in all content areas of agriculture. Moreover, all *Emerging Teachers* viewed themselves as prepared to use a variety of teaching methods to instruct their classes.

Table 1

Selected Personal and Professional Characteristics of Student Teacher Interns in Agricultural Education, Spring and Fall Semesters of 2009 (*N* = 28)

			Prepared in			Teaching Ability
Q-Sort	Sex	Age	Content	Teaching Method	School Setting	Viewpoint
12	M	21	N	Y	Rural	*Emerging*
9	M	22	Y	Y	Rural	*Emerging*
6	M	22	Y	Y	Suburban	*Emerging*
13	F	21	Y	Y	Suburban	*Emerging*
28	F	22	N	Y	Rural	*Emerging*
3	M	22	Y	Y	Suburban	*Emerging*
8	M	21	N	Y	Suburban	*Emerging*
22	M	23	Y	Y	Rural	*Emerging*
19	F	22	Y	Y	Rural	*Emerging*
25	F	22	Y	Y	Rural	*Emerging*
5	F	22	Y	Y	Rural	*Emerging*
16	F	23	Y	Y	Rural	*Emerging*
17	M	22	Y	Y	Rural	*Self-Assured*
11	F	22	N	Y	Rural	*Self-Assured*
4	M	23	Y	Y	Rural	*Self-Assured*
7	F	24	Y	Y	Suburban	*Self-Assured*
15	M	33	Y	Y	Suburban	*Self-Assured*
20	M	23	N	Y	Rural	*Determined*
24	M	23	N	Y	Rural	*Determined*
2	M	21	Y	Y	Rural	*Determined*
1	M	21	Y	Y	Rural	*Determined*
10	F	22	Y	Y	Rural	Confounded
18	F	21	Y	Y	Rural	Confounded
23	M	21	Y	Y	Rural	Confounded
27	M	23	Y	Y	Rural	Confounded
14	F	24	Y	Y	Rural	Non-significant
21	M	22	Y	Y	Suburban	Non-significant
26	F	22	Y	Y	Rural	Non-significant

Note. M = Male, F = Female; Y = Yes, N = No

Five interns held the viewpoint of *Self-Assured Teacher*. Of these, three were male and two were female. Three interns taught in rural schools, and two taught in suburban schools. Student teachers who held the *Self-Assured Teacher* view ranged in age from 22 to 33 years, with an average age of 24.5 years. Regarding content, only one *Self-Assured Teacher* reported she perceived being unprepared to instruct her classes. However, all *Self-Assured Teachers* perceived they were prepared to instruct their classes as it pertained to teaching methods (see Table 1).

Four interns held the viewpoint of *Determined Teacher*. This view was perceived by males, exclusively. All of those interns taught in rural schools. *Determined Teachers* ranged in age from 21 to 23 years, with an average age of 22 years. Regarding content taught, two viewed themselves as unprepared to teach the content of the courses they instructed. However, all *Determined Teachers* perceived they were prepared to use a variety of teaching methods (see Table 1).

The first area of time allocation examined was the amount of time interns devoted to instruction versus observation. It was found that the *Emerging Teacher* and the *Determined Teacher* taught almost 10 hours per week (M = 9.88, SD = 7.40 and M = 9.90, SD = 7.64, respectively) (see Table 2). In comparison, the *Self-Assured Teacher* taught in excess of one additional hour per week on average (M = 11.27, SD = 8.77).

Although *Self-Assured Teachers* spent more time teaching per week than the *Emerging Teachers* and *Determined Teachers*, they observed the least amount of time when compared to the other two views (M = 4.57, SD = 6.12). The *Emerging Teachers* observed slightly more than five hours per week (M = 5.24, SD = 5.63). And the *Determined Teachers* spent the most amount of time per week in observation (M = 5.90, SD = 6.20) (see Table 2).

Table 2

Differences in Time Spent Teaching versus Observing each Week by Teacher View

Experience	*M*	*SD*
Taught		
Emerging Teacher	9.88	7.40
Self-Assured Teacher	11.27	8.77
Determined Teacher	9.90	7.64
Observed		
Emerging Teacher	5.24	5.63
Self-Assured Teacher	4.57	6.12
Determined Teacher	5.90	6.20

The second area examined regarding time allocation was that in which interns devoted time to instruction in specific curriculum areas of agricultural education. Across all views, the most amount of time was spent teaching Agriscience I and II (see Table 3). For the *Emerging Teachers* (see Table 3), the majority of their time was spent instructing in the area of Agriscience I and II (M = 3.08, SD = 3.80), 7th and 8th grade Agriculture (M = 1.97, SD = 2.32), Plant Science/Natural Resources (M = 1.92, SD = 2.64), and Animal/Equine Science (M = 1.15, SD = 2.04). The *Self-Assured Teachers* spent the majority of their time instructing Agriscience I and II (M = 3.18, SD = 3.36), Plant Science/Natural Resources (M = 2.48, SD = 3.75), Agricultural Mechanics (M = 2.05, SD = 3.31), and 7th and 8th grade Agriculture (M = 1.78, SD = 1.96). The *Determined Teachers* spent the majority of their time instructing Agriscience I and II (M = 2.80, SD = 2.70), 7th and 8th grade Agriculture (M = 2.19, SD = 1.91), Animal/Equine Science (M = 2.00, SD = 2.10), and Agricultural Mechanics (M = 1.65, SD = 1.90) (see Table 3).

Table 3

Interns' Time Spent Teaching across the Agricultural Education Curriculum by Teacher View

	Emerging Teachers (12)		*Self-Assured Teachers* (5)		*Determined Teachers* (4)	
Curriculum Area	*M*	*SD*	*M*	*SD*	*M*	*SD*
Agribusiness and Marketing	0.04	0.28	0.00	0.00	0.40	1.10
Agricultural Communications	0.44	1.33	0.50	1.20	0.10	0.60
Agricultural Mechanics	1.05	1.79	2.05	3.31	1.65	1.90
Agriscience I and II	3.08	3.80	3.18	3.36	2.80	2.70
Animal/Equine Science	1.15	2.04	1.27	1.94	2.00	2.10
Leadership	0.23	0.89	0.00	0.00	0.00	0.00
Plant Science/Natural Resources	1.92	2.64	2.48	3.75	0.70	1.5
7th and 8th Grade Agriculture	1.97	2.32	1.78	1.96	2.19	1.91

The third area explored regarding the interns' time allocation was that in which they spent time teaching in a classroom versus teaching in a laboratory. The *Emerging Teachers* and the *Determined Teachers* spent approximately the same amount of time teaching in a classroom (M = 7.54, SD = 6.19 and M = 7.50, SD = 5.55, respectively); however, the *Self-Assured Teachers* spent more time teaching in a classroom each week (M = 8.20, SD = 6.29) when compared to the other two views (see Table 4).

Similar to the classroom teaching result, the *Emerging Teachers* and the *Determined Teachers* spent approximately the same amount of time teaching in a laboratory (M = 2.35, SD = 3.55 and M = 2.42, SD = 3.27, respectively). The *Self-Assured Teachers* spent the most amount of time teaching in a laboratory each week (M = 3.07, SD = 4.64) when compared to the other two teacher views (see Table 4).

Table 4

Time Spent Teaching in the Classroom versus the Laboratory each Week by Teacher View

Experience	*M*	*SD*
Classroom		
Emerging Teachers	7.54	6.19
Self-Assured Teachers	8.20	6.29
Determined Teachers	7.50	5.55
Laboratory		
Emerging Teachers	2.35	3.55
Self-Assured Teachers	3.07	4.64
Determined Teachers	2.42	3.27

The fourth area explored regarding the interns' time allocation was time spent in school during *usual* school hours versus the time they spent away from school during *usual* school hours. The *Emerging Teachers* spent the most amount of time in school during the school day (M = 18.82, SD = 9.20) (see Table 5). The *Self-Assured Teachers* spent nearly 18 hours per week (M = 17.87, SD = 9.53) in school. The *Determined Teachers* spent the least amount of time in school during the school day when compared to the other teacher views (M = 16.73, SD = 8.31).

When assessing the time spent out of school during the school day, the *Self-Assured Teachers* spent the least amount of time out of school (M = 3.65, SD = 6.20), and the *Emerging Teachers* spent five hours out of school per week (M = 5.00, SD = 7.21), which was the most of the three teacher views. The *Determined Teachers* spent slightly less than four and one-half hours out of school (M = 4.41, SD = 6.28) each week (see Table 5).

Table 5

Time Spent In School versus Out of School each Week by Teacher View

Location	*M*	*SD*
In School		
Emerging Teacher	18.82	9.20
Self-Assured Teacher	17.87	9.53
Determined Teacher	16.73	8.31
Out of School		
Emerging Teacher	5.00	7.21
Self-Assured Teacher	3.65	6.20
Determined Teacher	4.41	6.28

Conclusions

Time allocation data were connected to the interns' Q-sort data by teacher view, i.e., the *Emerging Teacher*, the *Self-Assured Teacher*, and the *Determined Teacher*. Age, sex, experience in agriculture courses at the high school level, location of the cooperating center, and specific courses instructed while at their cooperating centers did not substantially distinguish any of the participants' views. The *Determined Teacher* view was represented by male interns only; however, on closer inspection, an individual's sex was not found to be a predictive variable for that view. Although no single personal or professional characteristic explained any view entirely, several relevant findings did emerge from this study.

The first allocation of time examined was the amount of time interns devoted to instruction versus observation. It was found that those with the *Self-Assured Teacher* view taught the most in classroom and laboratory settings, and those with the *Determined Teacher* view spent the most amount of time observing. Specifically, the *Emerging Teacher* and the *Determined Teacher* views both spent nearly 10 hours teaching per week, and the *Self-Assured Teacher* view spent more than 11 hours teaching per week. Regarding the hours per week each view spent observing, the *Emerging Teacher* spent slightly more than five hours, the *Self-Assured Teacher* spent more than four and one-half hours, and the *Determined Teacher* spent almost six hour per week observing another instructor teach.

When considering how much time each view spent teaching in a classroom setting, the *Emerging Teachers* and the *Determined Teachers* both spent seven and one-half hours, and the *Self-Assured Teachers* spent more than eight hours teaching in a classroom setting. As for the

time each view spent teaching in a laboratory setting, the *Emerging Teachers* and the *Determined Teachers* spent less than two and one-half hours per week and the *Self-Assured Teachers* spent more than three hours per week teaching in a laboratory setting.

The next allocation explored time spent in school versus out of school during *usual* school hours. The *Emerging Teachers* spent the most amount of time in school, i.e., almost 19 hours per week. The *Self-Assured Teachers* spent approximately 18 hours per week in school, and the *Determined Teachers* spent almost 17 hours per week in school. In contrast, the *Emerging Teachers* spent five hours per week out of school, the *Self-Assured Teachers* spent slightly more than three and one-half hours out of school, and the *Determined Teachers* expended slightly more than four and one-half hours out of school per week.

Regarding content, all teachers spent the most time teaching Agriscience I and II curriculum. The least amount of time was spent teaching Food Science, Agribusiness and Marketing, and Leadership.

Discussion and Implications

The *Self-Assured Teachers* spent more time teaching in a classroom setting per week than the *Emerging Teachers* and *Determined Teachers.* Similar to the classroom teaching results, the *Self-Assured Teachers* spent slightly more time teaching in a laboratory setting per week, as well. In addition, the *Emerging Teachers* spent nearly 19 hours per week in school. This was nearly one hour more per week than the *Self-Assured Teachers* and more than two hours more per week than the *Determined Teachers*. When assessing the time spent out of school during the *usual* school day, the interns who held the *Emerging Teachers* view were out of school the most.

Student teaching should be the quintessential aspect of any teacher education program. Teaching efficacy can affect a student teacher's performance while interning (Tschannen-Moran et al., 1998). Therefore, implications exist for the placement of student teachers as well as the amounts and types of feedback provided to them. Why were some interns more assured of their teaching abilities than others? Could a different set of experiences at the pre-service level help student teachers perceive themselves as being more efficacious regarding their teaching performance? In particular, what types of early field-based experiences are needed to improve pre-service teachers' efficacy as it relates to teaching agricultural content?

Perhaps the time interns spend in various activities should be adjusted and monitored according to each individual. For example, if an intern perceives himself or herself to be inadequate when teaching a particular area of the curriculum, maybe that individual should focus on teaching that subject predominately. Then, after the intern increases his or her level of self-efficacy for teaching that subject matter, he or she could teach a different subject area. According to Bandura (1986, 1997), mastery experiences are the most influential sources of positive self-efficacy beliefs. However, becoming an effective teacher takes time and practice for pedagogical skills to be mastered. "Only in a situation of actual teaching can an individual assess the capabilities she or he brings to the task" (Tschannen-Moran et al., 1998, p. 229). The *Self-Assured Teacher* view stressed self-confidence as it pertained to teaching ability. Was it coincidental, therefore, the *Self-Assured Teachers* spent the most time per week teaching and the least amount of time observing?

Perhaps the reason the *Self-Assured Teachers* were so confident in their ability was because they spent more time teaching than interns who expressed the other views, i.e., more, and especially more positive teaching experiences, *fed* a growing view of confidence in their ability to teach. If so, this would support Bandura's (1997) self-efficacy theory that, over time, tasks can be accomplished with more efficacy and confidence. However, where did the confidence for the *Determined Teacher* view originate? Although mastery experiences are the most influential, observation of teaching has its benefits as well, i.e., through the form of vicarious experiences.

Mulholland and Wallace (2001) argued that vicarious experiences are most influential during the student teaching experience. Interns who expressed the *Determined Teacher* view reported observing the most of the three typologies.

In contrast, the *Self-Assured Teachers* observed the least amount in terms of time. It could be implied that these individuals had a greater sense of confidence in their own abilities and thus did not need to observe their cooperators teach. However, previous self-efficacy research has indicated that individuals tend to overestimate their abilities to perform various tasks (Woolfolk Hoy & Spero, 2005). Bandura (1997) stated, "[c]ompetent models command more attention and exert greater instructional influence than do incompetent ones" (p. 101). As such, this finding has implications for pre-service field observational experiences. Perhaps teacher aspirants in agricultural education should be provided a more robust set of experiences related to observing effective teaching prior to and during student teaching.

Recommendations

Agricultural education teachers spend a considerable amount of time outside of school during and after the school day performing job-related activities. Interns in this study spent an average of four and one-half hours per week outside of school performing program-related activities. It is imperative, therefore, to collect data regarding the non-formal educational experiences interns have with their students. Because agricultural education is a comprehensive program with numerous opportunities for rich learning experiences (Baker et al., 2012), teachers are expected to do more than just teach in a classroom (Roberts & Dyer, 2004). To this end, research should be conducted to determine how interns' views and allocation of time are impacted in areas outside the formal classroom, i.e., FFA events, SAEs, and community outreach efforts, and the impact this has on student learning. Moreover, it could be argued that students learn better through experiences that occur outside the confines of a classroom. Studies, therefore, should be conducted to track the time interns spend outside the classroom, and attempts made to measure the impact of that time on students' learning in agricultural education. In addition, other teacher-related activities, such as serving on hall and lunch duty, attending faculty meetings, and participating on students' individualized educational plans (IEPs) undoubtedly have an impact on interns' views of the profession they are preparing to enter. Additional research on the time invested in these activities and the effects that has on student learning should be assessed.

Future inquiries might not only address deficiencies in a student teacher's understanding of a given subject, but also determine if this deficiency is related to the time allocated to that subject or area. Interns can *intuit* whether enough time was allocated to various aspects of their teacher preparation. In other words, did the interns perceive they were prepared well because of the time allocated to a certain aspect of their educational preparation, or did they perceive that more time needed to be devoted to certain areas? Recommendations for time allocation, i.e., course credit hours required as well as given experiences, could be made in various areas of pre-service students' technical content preparation (Edwards & Thompson, 2010; Ramsey, Thornburg, & Bloomberg, 2014) based on student teachers' perceptions of time allocation whether sufficient or otherwise. Finally, other researchers are encouraged to consider using Q-methodology to describe and understand student teacher interns' sources of professional efficacy and how the contexts in which they spend time during student teaching as well as how much time is spent influence their professional growth and development. Q-method may be an appropriate tool for such a subjective and arguably idiosyncratic phenomenon.

References

Baker, M. A., Robinson, J. S., & Kolb, D. A. (2012). Aligning Kolb's experiential learning theory with a comprehensive agricultural education model. *Journal of Agricultural Education, 53*(4), 1–16. doi:10.5032/jae.2012.04001

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191–215. doi:10.1037/0033-295x.84.2.191

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman and Company.

Bandura, A. (2004). Swimming against the mainstream: The early years from chilly tributary to transformative mainstream. *Behaviour Research and Therapy, 42*(6), 613–630. doi:10.1016/j.brat.2004.02.001

Blackburn, J. J., & Robinson, J. S. (2008). Assessing teacher self-efficacy and job satisfaction of early career agriculture teachers in Kentucky. *Journal of Agricultural Education, 49*(3), 1–11. doi:10.5032/jae.2008.03001

Borko, H., & Mayfield, V. (1995). The roles of the cooperating teacher and university supervisor in learning to teach. *Teaching and Teacher Education, 11*(5), 501–518. doi:10.1016/0742-051X(95)00008-8

Brown, S. R. (1980). *Political subjectivity: Applications of Q methodology in political science*. New Haven, CT: Yale University Press.

Burris, S., McLaughlin, E. K., McCulloch, A., Brashears, T., & Fraze, S. (2010). A comparison of first and fifth year agriculture teachers on personal teaching efficacy, general teaching efficacy and content efficacy. *Journal of Agricultural Education, 51*(1), 22–31. doi:10.5032/jae.2010.01022

Byler, B. L., & Byler, L. F. (1984). Analysis of student teacher morale before and after student teaching. *Journal of the American Association of Teacher Educators in Agriculture, 25*(3), 22–28. doi:10.5032/jaatea.1984.03022

Croom, D. B. (2003). Teacher burnout in agricultural education. *Journal of Agricultural Education, 44*(2), 1–13. doi:10.5032/jae.2003.02001

Danielson, S. (2009). Q method surveys: Three ways to combine Q and R. *Field Methods, 21*, 219–237. doi:10.1177/1525822X09332082

Delnero, J. A., & Montgomery, D. (2001). Perceptions of work among California agriculture teachers. *Journal of Agricultural Education, 42*(2), 56–67. doi:10.5032/jae.2001.02056

Edgar, D. W., Roberts, T. G., & Murphy, T. H. (2009). Structured communication: Effects on teaching efficacy of student teachers. *Journal of Agricultural Education, 50*(1), 33–43. doi:10.5032/jae.2009.0103

Edwards, M. C., & Thompson, G. (2010). Designing technical agriculture curriculum. In R. M. Torres, T. Kitchel, & A. L. Ball (Ed.), *Preparing and advancing teachers in agricultural education*, pp. 112-128. Columbus, OH: Curriculum Materials Services.

Henson, R. K. (2002). From adolescent angst to adulthood: Substantive implications and measurement dilemmas in the deveopment of teacher efficacy research. *Educational Psychologist, 37*(3), 137-150.

Kantrovich, A. J. (2007). *A national study of the supply and demand for teachers of agricutlural education from 2004 – 2006*. Morehead, KY: Morehead State University.

Kelsey, K. D. (2007). Overcoming gender bias with self-efficacy: A case study of women agricultural education teachers and preservice students. *Journal of Agricultural Education, 48*(1), 52–63. doi:10.5032/jae.2007.01052

Knoblauch, D., & Woolfolk Hoy, A. (2008). Maybe I can teach those kids. The influence of contextual factors on student teachers' efficacy beliefs. *Teaching and Teacher Education, 24*(1), 166–179. doi:10.1016/j.tate.2007.05.005

Knobloch, N. A. (2006). Exploring relationships of teachers' sense of efficacy in two student teaching programs. *Journal of Agricultural Education, 47*(2), 36–47. doi:10.5032/jae.2006.02036

Knobloch, N. A., & Whittington, M. S. (2002). Novice teachers' perceptions of support, teacher preparation quality, and student teaching experience related to teacher efficacy. *Journal of Vocational Education Research, 27*(3), 331–341. Retrieved from http://scholar.lib.vt.edu.argo.library.okstate.edu/ejournals/JVER/v27n3/knobloch.html

Knobloch, N. A., & Whittington, M. S. (2003). Differences in teacher efficacy related to career commitment of novice agriculture teachers. *Journal of Career and Technical Education, 20*(1), 87–98. Retrieved from http://scholar.lib.vt.edu/ejournals/JCTE/v20n1/

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Upper Saddle River, NJ: Prentice Hall.

Krysher, S. (2010). *Using time allocation to understand the perceived teaching ability of student interns in agricultural education: A Q-method study*. Doctoral dissertation, Oklahoma State University, Stillwater.

Krysher, S., Robinson, J. S., Montgomery, D., & Edwards, M. C. (2012). Perceptions of teaching ability during the student teaching experience in agricultural education. *Journal of Agricultural Education, 53(*4), 29–40. doi:10.5032/jae.2012.04029

Lambert, M., Henry, A. L., & Tummons, J. D. (2011). How do early career agriculture teachers talk about their time? *Journal of Agricultural Education, 52*(3), 50–63. doi:10.5032/jae.2011.03050

Lawver, R. G., & Smith, K. (2014). Coping mechanisms Utah agriculture teachers use to manage teaching related stress. *Journal of Agricultural Education, 55*(1), 76–91. doi:10.5032/jae.2014.01076

McKeown, B., & Thomas, D. (1988). *Q methodology*. Newbury Park, CA: Sage Publications.

Mulholland, J., & Wallace, J. (2001). Teacher induction and elementary science teaching: Enhancing self-efficacy. *Teaching and Teacher Education, 17*(2), 243–261. doi:10.1016/S0742-051X(00)00054-8

Nekolny, D. J. C., & Buttles, T. (2007). Allocation of hours during the student teaching experience. *Proceedings of the 2007 North Central American Association for Agricultural Education Research Conference,* Columbia, MO, 208-222.

Pajares, F. M. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543-578. doi:10.3102/00346543066004543

Ramsey, J. W., Thornburg, R., & Bloomberg, B. (2014). An examination of undergraduate students' self-efficacy related to the performance of animal handling and management techniques. *Proceedings of the Southern Region Conference of the American Association for Agricultural Education, Dallas, TX, Feb. 1- 4, 2014,* 226-239. Retrieved from http://aaaeonline.org/uploads/allconferences/2-2-2014_383_2014_SAERC_Proceedings.pdf

Roberts, T. G., & Dyer, J. E. (2004a). In-service needs of traditionally and alternatively certified agriculture teachers. *Journal of Agricultural Education, 45*(4), 57–70. doi:10.5032/jae.2004.04057

Roberts, T. G., & Dyer, J. E. (2004b). Characteristics of effective agriculture teachers. *Journal of Agricultural Education, 45*(4), 82–95. doi:10.5032/jae.2004.04082

Roberts, T. G., Harlin, J. F., & Ricketts, J. C. (2006). A longitudinal examination of teaching efficacy of agricultural science student teachers. *Journal of Agricultural Education, 47*(2), 81–92. doi:10.5032/jae.2006.04027

Roberts, T. G., Mowen, D. L., Edgar, D. W., Harlin, J. F., & Briers, G. E. (2007). Relationships between personality type and teaching efficacy of student teachers. *Journal of Agricultural Education, 48*(2), 92–101. doi:10.5032/jae.2007.02092

Roberts, T. G., Briers, G. E., & Harlin, J. F. (2008). Peer modeling and teaching efficacy: The influence of two student teachers at the same time. *Journal of Agricultural Education, 49*(2), 13–26. doi:10.5032/jae.2008.02013

Robinson, J. S., Krysher, S., Haynes, J. C., & Edwards, M. C. (2010). How Oklahoma State University students spent their time student teaching in agricultural education: A fall versus spring semester comparison with implications for teacher education. *Journal of Agricultural Education, 51*(4), 142–153. doi:10.5032jae/2010.04142

Ross, J. A. (1994). The impact of an inservice to promote cooperative learning on the stability of teacher efficacy. *Teaching and Teacher Education, 10*(4), 381–394. doi:10.1016/0742-051X(94)90020-5

Schmolck, P. (2014). *PQMethod manual*. Retrieved from http://schmolck.userweb.mwn.de/qmethod/pqmanual.htm

Stripling, C., Ricketts, J. C., Roberts, T. G., & Harlin, J. F. (2008). Preservice agricultural education teachers' sense of teaching self-efficacy. *Journal of Agricultural Education, 49*(4), 120–130. doi:10.5032jae/2008.04120

Tippens, A., Ricketts, J. C., Morgan, A. C., Navarro, M. & Flanders, F. B. (2013). Factors related to teachers' intention to leave the classroom early. *Journal of Agricutlural Education, 54*(4), 58–72. doi:10.5032/jae.2013.04058

Torres, R. M., & Ulmer, J. D. (2007). An investigation of time distribution of pre-service teachers while interning. *Journal of Agricultural Education, 48*(2), 1–12. doi:10.5032jae/2007.02001

Torres, R. M., Ulmer, J. D., & Aschenbrener, M. S. (2008). Workload distribution among agricultural teachers. *Journal of Agricultural Education, 49*(2), 75–87. doi:10.5032jae/2008.02075

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202–248. doi:10.3102/00346543068002202

Watts, S., & Stenner, P. (2003). Q methodology, quantum theory, and psychology. *Operant Subjectivity, 26*(4), 155-173.

Watts, S., & Stenner, P. (2005). Doing Q methodology: Theory, method, and interpreatation. *Qualitative Research in Psychology, 2*(1), 67–91. doi:10.1191/1478088705qp022oa

Whittington, M. S., McConnell, E., & Knobloch, N. A. (2006). Teacher efficacy of novice teachers in agricultural education in Ohio at the end of the school year. *Journal of Agricultural Education, 47*(4), 26–38. doi:10.5032/jae.2006.04027

Wingenbach, G. J., White, J. M., Degenhart, S., Pannkuk, T., & Kujawski, J. (2007). Pre-service teachers' knowledge and teaching comfort levels for agricultural science and technology objectives. *Journal of Agricultural Education, 48*(2), 114–126. doi:10.5032/jae.2007.02114

Woolfolk Hoy, A., & Spero, R. B. (2005). Changes in teacher efficacy during the early years of teaching: A comparison of four measures. *Teaching and Teacher Education, 21*(4), 343–356. doi:10.1016/j.tate.2005.01.007