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2023 Western Region AAAE Research Conference Research Paper Review Process

The 2023 Western Region AAAE Research Conference Call for Papers was issued via the AAAE listserv in February 2023, with a submission deadline of May 1, 2023. Authors were invited to submit abstracts via FastTrack at http://aaae.expressacademic.org/login.php.

The 2023 Western Region AAAE Research Conference received 36 total abstracts. Personal identifiers were removed from research papers before released to invited reviewers. Authors were notified of paper acceptance at the completion of the review process. Abstracts were blind reviewed by a designated panel of reviewers for the conference. A total of 20 abstracts were accepted for presentation.

Our appreciation to Jon Ulmer, the AAAE Conference Manuscript Submission and Review Manager, for providing technical assistance and overseeing the paper review process using the FastTrack system. We also want to thank the panel of reviewers for their work in reviewing all manuscripts.

Finally, thank you to all the AAAE members for their submissions.

2023 Western Region AAAE Research Panel of Reviewers

Thank you to the professionals listed below who volunteered their time and expertise in the review process.

Courtney Gibson (Research Committee Chair)	Texas Tech University
Shannon Norris-Parish	New Mexico State University
Katie Abrams	Colorado State University
Jason Headrick	Texas Tech University
Jon Ramsey	Oklahoma State University
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Western Region AAAE Research Conference History

Year	Location	Chair(s)	University
1982	Austin, TX	Gary E. Briers	Texas A&M University
1983	Rio Rico, AZ	Phillip A. Zubrick	University of Arizona
1984	Oklahoma City, OK	David Cox	Cameron University
		James P. Key	Oklahoma State University
1985	Boise, ID	John E. Slocombe	University of Idaho
1986	Las Cruces, NM	Paul R. Vaughn	New Mexico State University
1987	Logan, UT	Gilbert Long	Utah State University
1988	Ft. Collins, CO	Ramsey Groves	Colorado State University
1989	Sparks, NV	Joseph G. Harper	University of Nevada, Reno
1990	Fresno, CA	James G. Leising	University of California, Davis
1991	Seattle, WA	Marvin D. Kleene	Washington State University
1992	Cody, WY	Carl L. Reynolds	University of Wyoming
1993	Bozeman, MT	Van Shellhamer	Montana State University
1994	Honolulu, HI	David Cox	University of Arizona
		Frank C. Walton	University of Hawaii
1995	Phoenix, AZ	Glen M. Miller	University of Arizona
1996	Moscow, ID	Jim Connors	University of Idaho
1997	Stillwater, OK	James White	Oklahoma State University
1998	Salt Lake City, UT	Gary S. Straquadine	Utah State University
1999	Corpus Christi, TX	Lance Keith	Texas Tech University
		Jacqui Lockaby	Texas Tech University
2000	Las Cruces, NM	Brenda Seevers	New Mexico State University
2001	Carmel, CA	William Kellogg	Cal Poly, San Luis Obispo
		J. Scott Vernon	Cal Poly, San Luis Obispo
2002	Spokane, WA	Michael K. Swan	Washington State University
2003	Portland, OR	Gregory W. Thompson	Oregon State University
		Brain K. Warnick	Oregon State University
2004	Honolulu, HI	Martin J. Frick	Montana State University
		Michael K. Swan	Washington State University
2005	Prescott, AZ	Billye B. Foster	University of Arizona
		Edward A. Franklin	University of Arizona
2006	Boise, ID	Lori L. Moore	University of Idaho
2007	Cody, WY	Carl L. Reynolds	University of Wyoming
2008	Park City, UT	Rudy S. Tarpley	Utah State University
		Brain K. Warnick	Utah State University
2009	Lake Tahoe, NV	Vernon Luft	University of Nevada, Reno
2010	Great Falls, MT	Shannon K. Arnold	Montana State University
		Carl G. Igo	Montana State University
2011	Fresno, CA	Mollie Aschenbrener	California State University, Chico
2012	Bellingham, WA	Michael Swan	Washington State University
2013	Lubbock, TX	Lori Moore	Texas A&M University

		Theresa Pesl Murphrey	Texas A&M University
2014	Kona, HI	Scott Burris	Texas Tech University
		Jon Ulmer	Texas Tech University
2015	Corvallis, OR	Misty Lambert	Oregon State University
		Jonathan Velez	Oregon State University
2016	Tuscon, AZ	Edward A. Franklin	Arizona State University
2017	Fort Collins, CO	Michael J. Martin	Colorado State University
2018	Boise, ID	Kasee Smith	University of Idaho
		Kattlyn Wolf	University of Idaho
2019	Anchorage, AK	Kattlyn Wolf	University of Idaho
2020	Virtual	Dustin Perry	Montana State University
2021	Bozeman, MT	Dustin Perry	Montana State University
2022	Las Cruces, NM	Shannon Norris-Parish	New Mexico State University
2023	Logan, UT	Tyson Sorensen	Utah State University
		Michelle Burrows	Utah State University

Research Sessions

Research Session I

September 19, 10:00 AM – 11:45 AM

Title	Authors
Latino Undergraduate Motivations to Pursue an Agricultural Science Degree	Leslie Vite, Dr. Jessica M. Toombs
An Investigation of the Perceptions and Barriers of School Farms	Emily R. Fuller, Jessica M. Toombs, Mollie S. Aschenbrener
Commonalities in Global Service-learning Activities on Alumni Academic Development	Samuel Ikendi, Michael S. Retallick, Gail R. Nonnecke, Donald R. Kugonza, Gregory S. Miller, Owusu Francis, Theressa N. Cooper, Grace Lubaale
Does Participation in Livelihood Education Programs Improve Household Food Security?	Samuel Ikendi, Owusu Francis, Dorothy Masinde, Ann Oberhauser, Carmen Bain
Who Teaches and Why? Analyzing Why Individuals Choose to Pursue a Career Teaching Secondary Agricultural Education	Josh Odom, Chelsea Hatch & John Rayfield
An Analysis of Time Allocation of Student Teachers in Each Circle of the Three-Circle Model of Agricultural Education	Krysti Kelley & John Rayfield
Exploring Alternatively Certified Agriculture Teachers' Choice to Teach	Dr. Eryn Pierdolla, Dr. Scott Burris
The Needs of Oklahoma School-Based Agricultural Education Teachers Related to Teaching Agriculture, Food and Natural Resources Topics	Kristopher R. L. Rankin III, Christopher J. Eck, Bradley M. Coleman, Kayla N. Marsh, Nathan A. Smith
Strategies Behind the Communications: An Analysis of Social Media Platforms and Online Communication Channels Utilized by Agricultural Organizations in Texas	Reagan Ellison, Erica Irlbeck, Courtney Gibson, Laura Fischer
A Case Study Using Q Methodology to Explore the Attitudinal Orientation of Sorghum Producers Toward Sustainable Agricultural Practices	Haleigh Erramouspe, Dr. Lindsay Kennedy, Dr. David Doerfert, Dr. Nellie Hill

Research Session II

September 19, 4:00 PM – 5:45 PM

Title	Authors
Vicariously Visiting an Agricultural Facility: Exploring Student Perceptions of an Interactive Virtual Tour	Kylie Harlan, Dr. Courtney Meyers, Dr. Laura Fischer & Dr. Lindsay Kennedy
A Case Study in Social Media Adoption: Agricultural Input Companies' Perceptions in Ecuador	Joshue Lewis, Erica Irlbeck
Attitudes of Secondary Agricultural Education Students Toward Agriculture and STEM	Ms. Alyssa McQuiston, Mr. Nathan Smith, Dr. Chris Eck, Dr. Rob Terry Jr., Dr. Jon Ramsey
Identifying Teacher's Perceived Tools and Equipment Availability to Teach Welding Before and After a Professional Development Workshop	Jacob Ramos, Bradley Borges, Ryan Anderson, & Douglas Morrish
Tasks Associated with Teaching School-Based Agricultural Education: Classroom and Laboratory Instruction	Ryan W. Best, Dr. J. Shane Robinson, Dr. Robert Terry, Jr., Dr. M. Craig Edwards, Dr. Ki L. Cole
Effectiveness in the Classroom: A Quantitative Evaluation of Agricultural Educators' Competence Levels Regarding the Qualities of an Effective Teacher	Dr. William Norris, LaJoy Spears, Dr. Steve Fraze
Agricultural Education for All: Importance and Ability of Agricultural Educators to Integrate Special Education Competencies into Professional Practice	Dr. William Norris, LaJoy Spears, Dr. Steve Fraze
Exploring the Mid-Range Impacts of an Agriculture-Based Study Abroad Program	Michaela Mecham, Ryann Vierra, Dr. Tyson J. Sorensen, Dr. Thomas M. Henderson, Dr. Alyssa Schager
"I Can…..": Evaluating Students' Approach to Understanding Cultural Competency through Study Abroad and Reflective Journaling	Kameron, Rinehart, Dr. Jason Headrick
Expectations vs. Realities: An Examination of Stated Workforce Development Skills in the Agricultural Industry	Alexandra Salinas, Dr. Jason Headrick

Table of Contents

Latino Undergraduate Motivations to Pursue an Agricultural Science Degree

Leslie Vite, California State University, Chico
Jessica M. Toombs, California State University, Chico

Though Hispanic students are the largest growing college student population, they also exhibit lower graduation rates, longer time to graduation, and lower grade point averages than other college student demographics (Cottrell, 2021). This leads to the concern that colleges and universities may be enrolling Hispanic students, but not providing appropriate supports once students are on campus (Venegas, 2021). Institutions enrolling minority students have a moral obligation to create opportunities for student success (Becker & Cox, 2022). Latino/a students represent nearly 50% of enrollment in the College of Agriculture (COA) at California State University, Chico (Chico State) (Chico State, 2022). Therefore, we were interested in students' motivations to begin and continue their higher education as an insight to effective supports for increasing Hispanic graduation rates. This project was funded by a Board of Governor's award.

Expectancy value theory (EVT) provided the conceptual framework of the study. EVT describes motivation as expectations of success regulated by personal utility and related costs (Wigfield & Eccles, 2000). Individuals are more motivated in tasks with greater perceived success rates, more utility, and lower costs and less motivated when the opposite is true (Day, 2020). By lowering perceived costs and increasing utility and success expectations, institutions of higher education may be able to influence student success rates (Venegas, 2021).

Purpose and Research Question

The purpose of the study was to provide direction for higher education programs to better serve their Latino/a students. We sought to answer the research question of, how can higher education programs better serve Latino/a students' agricultural degree completion based on student motivations? This study aligns with the third research priority of the American Association for Agricultural Education which asks, in part, "What strategies are effective in recruiting diverse populations into agriculture and natural resource careers?" (Stripling & Ricketts, 2016, p. 31).

Methodology

In order to meet the purpose and research question above, we employed a hermeneutic phenomenological qualitative approach (Merriam, 2002). The identified phenomenon was the lived experiences of Latino/a undergraduates in the COA at Chico State (Creswell & Poth, 2018). Semi-structured interviews were conducted with 14 participants during the Spring 2023 semester. Prior to data collection, an interview protocol was established and reviewed by experts in qualitative methodology and cultural studies. Once permission was obtained through the Institutional Review Board, participants were recruited through snowball sampling (Creswell & Poth, 2018). An initial mass email to all COA undergraduates was then followed by targeting of additional participants through recommendations from study participants and faculty members. Data saturation was found after 14 interviews. To protect the identity of participants, each were assigned a pseudonym for the duration of the study.

Once interview recordings were transcribed, each was hand-coded using in-vivo procedures (Saldaña, 2016). In the initial round, both authors coded each participant's transcripts separately (Creswell & Poth, 2018) using the constant comparative method (Creswell & Guetterman, 2019). Codes from each author were then compared to the transcripts to find consensus for each code, resulting in 350 unique codes. These codes were organized into seven themes to produce the final codebook (Creswell & Poth, 2018). Transcripts were analyzed using the codebook to create an audit trail and develop trustworthiness in the study (Creswell & Guetterman, 2019).

Both authors are members of the COA at Chico State. Leslie Vite is an undergraduate researcher who identifies as a Hispanic, bilingual female. Jessica Toombs is an assistant professor of agricultural education who identifies as a White, non-Hispanic, monolingual female with a pragmatic interpretive framework. We took strides to bracket our experiences. While we acknowledge our positions allowed us unique access to participants, it also created potential avenues for bias to influence the study. Independent coding followed by completion of a unified codebook was used to address this potential bias (Creswell & Poth, 2018). In addition, we consulted outside subject and methodology experts on the design and data analysis of the study.

Demographic information was collected from all 14 participants, 11 of which are first-generation college students. The majority of participants identified as female with two males and one non-binary participants contributing interview data. These 14 participants consisted of 13 Mexican or Mexican American nationalities with one other Latin America country represented. Participants included 3 freshmen, 1 sophomore, 5 juniors, and 5 seniors from all majors in the COA. Aged 18 to 31, all participants reported holding paid employment while also being involved in campus organizations. Twelve individuals have participated in a minorities in STEM group.

Findings

The following seven themes emerged from the interview transcripts through extensive constant comparative in-vivo coding and data analysis. While many similar codes were expressed from multiple participants, unique perspectives, when present, are detailed below.

Familia

The theme of *Familia* included codes relating to familial support of higher education pursuits and the importance of education in the home. Repeatedly, parents were referred to as the main support systems with siblings and cousins also mentioned as sources of knowledge and inspiration. Juliet expressed this as "the one person that has kept me going is my mom." Kay stated, "My parents have always been very supportive of like, lo que quieras estudiar (whatever you want to study)." Coa became emotional in expressing his thankfulness for the support of his family. Older siblings were mentioned as trailblazers and role models while participants felt a duty to inspire and be an example for younger siblings. Estrella found motivation in "knowing that my little sister looks up to me." Raquel explained how her older brother and sister helped to shape her college choices from their experiences.

Each participant shared a strong importance placed on education in their family. Sam expressed this as "in my household, that (education) was the backbone of everything." This importance was communicated through an expectation of good grades and college degrees. All participants noted

interest in graduate or terminal degrees. The emphasis on education seemed to stem from social mobility opportunities and family duty responsibilities. Raquel identified the American dream in her family "(Parents) wanted us to have a better life than what they had." Britney said, "If you go in there without any education, you're going to be stuck on the bottom majority of your life. But if you come to a college, get at least a degree. You're going to be high up there doing research and you're going to get a good position." Confetti explained, "I just don't want to let them (family) down… especially for my mom who immigrated here." As Martha summated, "familia is everything."

Personal Agricultural Experiences

The depth and breadth of agricultural experiences varied amongst participants. Some, such as Martha, Britney, May, and Camilia, described agricultural experiences from early childhood. Most of these experiences stemmed from parental employment. Participants witnessed their parents and other family members perform manual labor as field workers in fruit and vegetable production. These connections to parents' occupations opened doors for participants to become involved in the agricultural industry. Britney described, "My dad has always worked the fields, 50 plus years. He would always take us with them." Coa told stories of joining his father in their family business and slowly gaining responsibilities as he grew older. Local school-based agricultural education programs also provided entrance into the agricultural industry for some participants. Others, such as Confetti and Lily, did not identify agricultural connections in their backgrounds. For Sam and others with limited production agriculture backgrounds, they perceived this as a limitation to their potential within the COA and agricultural industry. Camilia recognized a difference between herself and peers with "my agricultural background is very humble compared to many other people."

Perceptions of Latinos in Agriculture

Across all participants Latinos were seen as manual laborers primarily employed as farm workers in fruit, vegetable, and nut production. Participants identified with the image of the Latino farmworker, using "I," "we," and "us" to describe roles played by Latinos in agriculture. The owners, bosses, or managers were seen as members of the "other" group. As Vincente described, "When I see people from my experiences, they are usually just like supervisors, or below supervisors." There was also a shared sense of pride for Latinos in agriculture. Camilia looked forward to interacting with and advocating for Latino field workers. As she explained, "I understand the culture of the field workers, and that's going to give me a special type of connection and a level of comfort with the workers, that I will be able to be a better leader."

Hechale con Ganas (Give it Your All)

Codes aligning to participants' strong sense of intrinsic motivation were grouped into the *Hechale con Ganas (Give it Your All)* theme. Participants commonly used this phrase to describe overcoming past struggles or witnessing family's sacrifices which have provided the motivation to continue pursuing their goals. Brittany expounded, "I've already invested too much time… to just give up at the last lap of the race." After spending years away from family, Destiny said she had "sacrificed way too much to give up." Juliet alluded to the refrain of "hechale con ganas" (give it your all) to describe this philosophy. Much of this intrinsic motivation seemed to be tied to career opportunities. Participants acknowledged college is difficult but projected a return of investment in future income, ability to give back to community, and representing their family as

a college graduate. Camilia explained it this way, "As Hispanics, because our parents have such a limited educational background, we really want to, like, stand out and make a difference for our communities." May agreed with, "We come here for a better opportunity and what we want to do for future generations."

Discrimination

The theme of *Discrimination* included both personally experienced and vicarious incidents of racial discrimination. Participants have been called explicit racial slurs as well as endured exclusion and microaggressions. The racial slurs were heard both on and off campus. For Juliet, this was a new experience, "I have never in my life been called (racial slur) until I moved here." Participants felt a lack of representation both in the COA and the wider agricultural industry, but also recognized instances of cultural taxation when asked to be "the diversity marker" as Sam described. Destiny and Sam recited a lack of recognition for the achievements of Latino/a students in the COA. Participants who had not personally experiencing overt racism considered themselves "one of the lucky ones" as Brittany, Coa, Camilia, Martha, and Vincente described. Lily, a freshman, hoped she will not personally experience racism during her college experience.

Assimilation or Separation

There was a tendency amongst participants to feel a need to either fully assimilate to the white culture or separate themselves from white peers. For some, the distance from home contributed to this sensation. As Vincente explained, "I do feel like I'm more whitewashed now" yet "it's a lot easier to make friends with people in the same culture as me." Estrella recognized this phenomenon in her friend group but also in her classes "you can tell the little group in the front of white people and then you can see all the other brown people in another corner." Brittany stated, "since I have lighter skin, I can assimilate more into the Caucasian side of town… because I could kind of get away with being white sometimes."

Supports Received and Requested

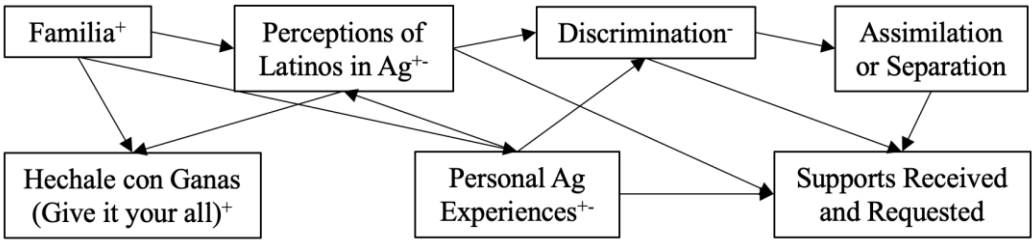
Participants identified a variety of supports they have received outside of family and additional assistance they believed would benefit their undergraduate experience. Peers, high school teachers, faculty, financial aid, student employment, and religious groups were credited with providing additional supports for participants outside of their families. These supports relieved financial pressures or provided emotional outlets. Opportunities to celebrate Hispanic and Latino culture was the most common requested support from participants. Juliet identified opportunities to "incorporate the holiday" and hear more spoken Spanish in official settings. Destiny and others looked for more informal events to "just talk about our culture. Let's have fun and cafecito." While appreciation was shown for the minorities in STEM group, wishes to expand the program were expressed by several participants. Participants identified a need to see others like themselves highlighted by the COA, both as students and industry professionals. As Vincente explained, "I would love to see people my color, in my background when I go to take tours."

Conclusions, Implications, and Recommendations

Participants identified five areas of motivations in undergraduate agricultural degree completion. Figure 1 displays the relationships between themes and identifies the factors of motivation, both positive and negative. Participants' *Personal Agricultural Experiences, Perceptions of Latinos in*

Agriculture, and *Hechale con Ganas (Give it Your All)* originated in *Familia* influences. Family is central in the Hispanic and Latino cultures (Espinoza, 2010). Educators throughout the primary, secondary, and post-secondary levels must affirm their Latino/a students' families (Preuss et al., 2020). Our participants recognized the opportunities in agriculture to support their families and communities, with some motivated by advocating for farm workers and advancing Latinos in the industry. This sense of family first can cause discord with intrinsic motivations for education when family needs conflict with educational demands. Supporting Latino/a college students should include honoring family responsibilities through flexible opportunities to participate and continue their educational experiences (Espinoza, 2010). We recommend institutions host events to invite family members to meet faculty and witness student life, including classes, campus living, and athletic events. For first-generation students, this shared experience may decrease the disconnect felt between students and their families.

Figure 1.
Relationships Between Study Themes



Note: $^{+}$ = Motivators, $^{-}$ = Demotivators

The sense of community is paramount in Latino culture (Espinoza, 2010) and was the undercurrent for the requested support of additional events for Latino/a students and cultural awareness. We recommend institutions provide multiple opportunities and meeting spaces for Latino/a students to both conduct formal meetings and informal social occasions. Students connected to campus life are more likely to complete their degree with higher GPAs and are more employable after graduation (Padilla, 1999).

Like many undergraduates in colleges of agriculture, our participants represented a variety of backgrounds in production agriculture (Foreman et al., 2018). While those with deep backgrounds in the agricultural industry were motivated to continue their education in this field, the diversity of experiences created a sense of inferiority in some participants, potentially limiting a students' motivation in pursuing their degree. The internalizations in *Perceptions of Latinos in Agriculture* may contribute to this barrier in agricultural experiences (Bandura, 1997). We recommend the COA and sister institutions provide additional experiential learning and internship opportunities specifically for students without agricultural backgrounds. These opportunities have the potential to provide career exploration while also creating a more level competition for internships and employment.

Discrimination was felt or witnessed by all participants in this study. Witnessed discrimination can become internalized and create trauma as if it were personally experienced (Wofford et al., 2019). The lack of representation, racial slurs, exclusion, and microaggressions are demotivators in the pursuit of a college education (Alcantar & Hernandez, 2020). We recommend faculty, staff, and administrators in colleges of agriculture be fully trained and supported to identify and

respond to instances of racial discrimination. Negative experiences with diverse peers may perpetuate a choice between assimilation and separation. Minorities are often encouraged to forego cultural expressions or isolate to members of their own culture (Schmitz, 2004). We recommend colleges and universities promote full inclusion of cultural expressions to increase student motivation (Schwartz et al., 2013; Venegas, 2021; Wigfield & Eccles, 2000)

References

Alcantar, C. M. & Hernandez, E. (2020). "Here the professors are your guide, tus guías": Latina/o student validating experiences with faculty at a Hispanic-serving community college. *Journal of Hispanic Higher Education, 19*(1), 3-18. https://doi.org/10.1177/1538192718766234

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

Becker, R. Y., & Cox, T. (2022). An investigation of comparative Hispanic student success in Calculus I at four state of Florida universities. *Journal of the Scholarship of Teaching and Learning, 22*(1), 17-20. https://doi.org/10.14434/josotl.v22i1.30563

Chico State. (2022). *Student diversity by race/ethnicity*. https://wildcats-bi-ext.csuchico.edu/t/InstitutionalResearch/views/EmployeeStudentDiversity/StudentDiversity?iframeSizedToWindow=true&:embed=y&:showAppBanner=false&:display_count=no&:showVizHome=no

Cottrell, R. S. (2021). Student performance in online classes at a Hispanic-Serving Institution: A study of the impact of student characteristics in online learning. *Online Learning Journal, 25*(3), 18-35. https://files.eric.ed.gov/fulltext/EJ1320258.pdf

Creswell, J. W., & Guetterman, T. C. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (6th ed.). Sage Publications, Inc.

Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage Publications, Inc.

Day, C. T. (2020). Expectancy value theory as a tool to explore teacher beliefs and motivations in elementary mathematics instruction. *International Electronic Journal of Elementary Education, 13*(2), 169-182. https://doi.org/10.26822/iejee.2012.182

Espinoza, R. (2010). The good daughter dilemma: Latinas managing family and school demands. *Journal of Hispanic Higher Education, 9*(4), 317-330. https://doi.org/10.1177/1538192710380919

Foreman, B. Retallick, M., & Smalley, S. (2018). Changing demographics in college of agriculture and life sciences students. *NACTA Journal, 62*(2), 162-167. https://www.jstor.org/stable/pdf/90022551.pdf?refreqid=excelsior%3A550b1eee247772debc9e51925de3bcb0&ab_segments=&origin=&initiator=&acceptTC=1

Merriam, S. (2002). *Qualitative research in practice: Examples for discussion and analysis.* Jossey-Bass

Padilla, R. V. (1999). College student retention: Focus on success. *Journal of College Student Retention: Research, Theory & Practice, 1*(2). https://doi.org/10.2190/6W96-5288-N1KP-H17N

Preuss, M., Sosa, E., Rodin, J., Ramos, J., Dorsett, C., & Burleson, C. (2020). Competence of faculty, staff, and administrators in Hispanic culture: Evidence from three surveys of personnel and students at Hispanic-serving institutions. *International Journal of Research in Education and Science, 6*(2), 202-230. https://files.eric.ed.gov/fulltext/EJ1250695.pdf

Saldaña, J. (2016). *The coding manual for qualitative researchers* (3rd ed.). Sage Publications, Inc.

Schmitz, P. G. (2004). On the alternative five-factor model: Structure and correlates. In *On the Psychobiology of Personality. https://doi.org/10.1016/B978-008044209-9/50006-3*

Schwartz, S. J., Waterman, A. S., Umaña-Taylor, A. J., Lee, R. M., Kim, S. Y., Vazsonyi, A. T., Huynh, Q. L., Whitbourne, S. K., Park, I. J. K., Hudson, M., Zamboanga, B. L., Bersamin, M. M., & Williams, M. K. (2013). Acculturation and well-being among college students from immigrant families. *Journal of Clinical Psychology, 69*(4), 298-318. https://doi.org/10.1002/jclp.21847

Stripling, C. T., & Ricketts, J. C. (2016). Research priority 3: Sufficient scientific and professional workforce that addresses the challenges of the 21st century. In T. G. Roberts, A. Harder, & M. T. (Eds.), *American Association for Agricultural Education national research agenda* (pp. 29-35). University of Florida Department of Agricultural Education and Communication. https://aaaeonline.org/resources/Documents/AAAE_National_Research_Agenda_2016-2020.pdf

Venegas, K. M. (2021). Hispanic Serving Institutions (HSIs) role in the development of Latinx student leaders. *New Directions for Student Services, 2021,* 89-99. https://doi.org/10.1002/yd.20459

Wigfield, A., & Eccles, J. S. (2000). Expectancy-value theory of achievement motivation. *Contemporary Educational Psychology, 25,* 68-81. https://doi.org/10.1006/ceps.1999.1015

Wofford, N., Defever, A. M., & Chopik, W. J. (2019). The vicarious effects of discriminations: How partner experiences of discrimination affect individual health. *Social Psychological and Personality Science, 10*(1), 121-130. https://doi.org/10.1177/1948550617746218

An Investigation of the Perceptions and Barriers of School Farms

Emily R. Fuller, Texas A & M University
Jessica M. Toombs, California State University Chico
Mollie S. Aschenbrener, California State University Chico

The use of school farms for learning has been an integral component of school-based agricultural education (SBAE) since the beginning of vocational agriculture (Tucker, 1994; Shoulders et al., 2011). Understanding of available laboratories is necessary for the development of instructional strategies which enhance scientific inquiry and problem solving (Shoulders & Meyers, 2012). It is uncertain how SBAE laboratories are utilized at each school, therefore it is essential to conduct assessments of the utilization of facilities used as learning tools and establish a baseline of knowledge (McCarthy, 1981). It may benefit stakeholders responsible for funding, maintaining, and building of SBAE laboratory facilities to consider the overall utilization of those facilities (Twenter & Edwards, 2017).

SBAE facilities are learning spaces with implications for employment or entrepreneurship; facilities designed and equipped with training needs which meet the needs of communities and specific regions (Twenter & Edwards, 2017). School farms may enhance the application of STEM concepts taught in SBAE, provide an avenue to market SAE projects, and prepare students for the workforce (Twenter & Edwards, 2017). According to Baker et al. (2020), agriculture facilities are lacking in several areas and have illustrated a deficit in CTE programs. Research illustrates the perceptions of barriers regarding the use of agricultural laboratories which impacts the frequency of use (Shoulders & Meyers, 2012). The physical environment of educational facilities affects students' learning, achievement, and attendance (Duran-Narucki, 2008; Filardo et al., 2019; Maxwell, 2016). The availability of school facilities and the quality of SAE programs has a strong correlation (Anyadoh & Barrick, 1990). SBAE facilities have shown to be a determining factor in the development and participation in SAEs.

The theory of planned behavior (Ajzen, 1991) served as the theoretical framework of this study. Intended behavior can be accurately predicted by analyzing the attitude toward behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). The general expectation for the teacher to utilize laboratory facilities is supported by the theory of planned behavior (Phipps, et al., 2008). Ability, means, and opportunity to perform a behavior provides motivation for a person to model a behavior (Ajzen, 1991). Some aspects of the SBAE programs, facilities, and activities are grounded in the theory of planned behavior.

Purpose and Research Objectives

The purpose of this study was to examine the differences in opportunities and applications of SBAE facilities based on the perceptions of secondary agriculture instructors in the Superior Region. This research aligns with the American Association for Agricultural Education's National Research Agenda priority number five which focuses on efficient and effective agricultural education programs (Roberts et al., 2016). The research objective was to identify agricultural teacher perceptions of SBAE facilities.

Methodology

This research utilized a descriptive survey design. The survey was modified from the instrument of another study conducted by Lambert et al. (2018). Due to the population size of 151 SBAE teachers in the Superior Region, a digital questionnaire was the most favorable means of distribution (Gilbert, 2013).

The target population for this study included agricultural educators who were actively teaching in the Superior Region. The population of the study consisted of 151 teachers and of those 98 responded to the survey. Usable responses numbered 74, resulting in a 49% response rate. No significant differences were found between early and late responses (t = -0.61, df = 41). The average age of the respondents was 36.64 years (*SD* = 10.71, *Range* = 23-66). Teachers have taught an average of 11.30 years (*SD* = 9.29, *Range* = 1-35). The respondents' average years working on a school with a farm was 10.65 years (*SD* = 8.97, *Range* 1-33). All 74 respondents indicated their SBAE program includes a school farm.

The survey contained 20 questions. The survey was composed of various question types including seven multiple choice items, one text entry, six matrix tables, five sliders, and one rank order question. Agriculture teacher's perceptions of school farms were measured by utilizing a semantic differential scale technique (Gilbert, 2013). Participants' perception of the primary purposes, instructional activities, and participation was measured. The semantic differential scale measures how participants feel about a product or experience based on a scale of polar opposites (Baxter et al., 2015).

The original questionnaire was evaluated by a committee of experienced professionals in the agricultural education field to ensure the validity of the instrument (Gilbert, 2013). Edits to the original instrument were assessed for face and content validity by a team of SBAE and survey research experts. Reliability for this study was determined using Cronbach's alpha. The post hoc reliability estimate suggested a Cronbach's alpha of 0.74. According to statistical data, the survey instrument was both reliable and valid.

Findings

The research objective aimed to identify agricultural teacher perceptions of SBAE facilities. The strongest levels of agreement were with the item *All students have the opportunity to participate in hands-on activities at the facility*. Of the respondents, 75% (*f = 54*) agreed or strongly agreed (*M* = 5.83, *SD* = 1.65). The items closely following were *The primary use of the facilities is for SAE* with 68.5% (*f =24*) of respondents agreeing or strongly agreeing (*M = 5.64, SD* = 1.50), and *The facilities are an extension of the classroom* with 64.39% (*f* = 47) of respondents agreeing or strongly agreeing (*M = 5.59, SD* = 1.58). Teachers (*f = 16*) slightly agree *The instructional activities performed on the facilities are pre-planned (M = 5.32, SD = 1.26).* The criteria *All students are included in activities on the school farm* is slightly agreed upon by 13.89% (*f = 10*) teachers (*M = 5.06, SD = 1.76*). Teachers perceive *The primary use of the facilities is for formal instruction* as neutral (*M* = 4.17, *SD* = 1.62). This is the largest disagreement from teachers, 19.44% (*f* = 14) disagree or strongly disagree.

Table 1 displays teachers' opinions of potential barriers when planning use of the school farm. *Ability to engage all students in the activity* (*M* = 4.43, *SD* = 0.83) and *Ability to oversee and help with the activity* (*M* = 4.43, *SD* = 0.94) garnered the highest sense importance in relation to barriers while *Students' prior experience* (*M* = 2.63, *SD* = 1.27) and *Time of year* (*M* = 3.54, *SD* = 1.29) were perceived as the least important barriers.

Table 1.
Importance of Barriers as they Relate to Use of School Farm

Statement	*n*	*M*	*SD*
Ability to engage all students	72	4.43	0.83
Ability to oversee and help	72	4.43	0.94
Availability of animals and crops	72	4.39	0.95
Condition of school farm	71	4.28	0.95
Distance	72	3.74	1.57
Facilities	72	4.17	1.24
Finances	72	3.92	1.31
Students' prior experience	72	2.63	1.27
Time of year	72	3.54	1.29
Weather	72	3.68	1.21

Level of community support for school farms was measured using a sliding scale ranging from 1-10. 1 indicates minimum support, 10 indicates strong support. Teachers indicated a mean level of support of 7.33 (*SD* = 2.71). 22 teachers selected 10 indicating the strongest support whereas 4 teachers selected 1 indicating minimum support from the community.

The average time teachers and students spend working on the farm during various times of the year was identified. Teachers spend an average of 5.45 hours working/maintaining the farm during school hours (*SD* = 12.69). On average 3.81 hours are spent by teachers working on the farm after school hours per week (*SD* = 3.31). Respondents indicated they spent an average of 28.1 hours working on the school farm over summer per week (*SD* = 54.23). Per week, students spend an average of 3.34 hours working on the school farm during school hours (*SD* = 2.90). Student time spent working on the farm after school hours averages 5.53 hours per week (*SD* = 8.31). Respondents indicated over summer students spend an average of 20.5 hours working on the school farm per week (*SD* = 45.09).

Conclusions and Implications

Agriculture teachers perceive the school farm facilities as an extension of the classroom. However, teachers disagree that the *primary* use of the facilities are for formal instruction or SAE. This may reflect the teachers' perception that learning does happen on the school farm but not through a singular component of the three-circle model. Experiential learning should

incorporate all three circles of the 3-circle model (Baker et al., 2012). Formal experiential learning may take place in classrooms and laboratory settings (Roberts, 2006) as well as SAE (Toombs et al., 2022). The purpose of the 3-circle model is not achieved when one component is left out. In addition, formal instruction may not be taking place on the school farm due to the proximity of the classroom to the school farm. Formal instruction may primarily occur in the classroom before or after a laboratory on the school farm.

Teachers do not agree all students are included in the activities on the school farm and have the opportunity to participate in hands-on activities. This may be due to the lack of formal and laboratory instruction on the school farm during class time. Learners must actively interact with the environment, ideas, and activities (Ciot, 2009; Piaget, 1977) to achieve true learning through experience (Dewey, 1938), and to form concrete experiences, abstract conceptualization, reflective observation and active experimentation which deepens critical thinking (Kolb, 1984). Without the proper facilities to do so, students are restricted in their learning opportunities. Agricultural teachers must provide experiential learning opportunities for *all* students.

Teachers indicated instructional activities on the school farm are not preplanned. These perceptions may indicate the school farm is an underutilized extension of the classroom, which may be due to potential barriers. Research conducted by Shoulders and Meyers (2012) illustrated perceptions of barriers in relation to the use of SBAE laboratories affects the frequency of use of SBAE laboratories. The theory of planned behavior suggests ability, means, and opportunity motivates a person to perform a behavior (Ajzen, 1991). Furthermore, it is possible that teachers do not know how to facilitate learning on the school farm. Teachers may not pre-plan activities due to the time it takes to navigate the identified barriers (Lowe et al., 2013; Shoulders & Meyers, 2012). The effectiveness of SBAE facilities is dependent of the teacher's willingness to utilize those facilities (Cooper, 1980). Potential barriers and perceptions which influence attitudes may also translate to the student motivation to participate in learning on the farm. Although there are adequate facilities, the condition of the facilities, the time and personnel required to maintain and manage those facilities may affect instructional opportunities at the school farm. Poorly maintained facilities effect student learning and relay negative messages and feelings (Cheryn et al., 2014; Duran-Narucki, 2008; Maxwell, 2016). High quality facilities are linked to student and teacher success (Barbra, 2006; Lavy & Nixon, 2017; Uline et al., 2009). Gilbert (2013) also identified time spent working on and maintaining the school farm as a potential barrier. Teachers and students spend time at the school farm during school hours, after school, and over summer. Teachers may be expected to be the primary manager of the school farm due to the nature of their contract and pay, or the conversation of an alternate manager and the permeameters of a farm manager position have not yet been explored by administrative groups. Teachers and students may be having to spend time overcoming barriers of the school farm rather than participating in laboratories directly related to concepts learned in the classroom.

Recommendations

Recommendations based on the study include in-service training for agriculture teachers and pre-service teachers in pre-planning activities which utilize the school farm. Training on how to utilize SBAE facilities for science laboratories may be valuable to the teacher and the future of education. Teacher preparation institutions should strengthen their awareness of potential

barriers of the school farm. Institutions can use this information to train and prepare pre-service teachers how to manage the school farm and pre-plan experiential learning opportunities. Institutional preparation may include required courses, specialized workshops, internship hours, and/or required industry hours specifically dedicated to time spent on high school farms. Institutions may consider the development of student projects which requires a unit plan for curriculum which directly utilizes school farms for formal instruction and laboratories. Institutions may encourage students to facilitate a portion of their unit within a college course or at a secondary SBAE program. These opportunities may allow facilities to better serve as an extension of the classroom, a setting for formal instruction, include more students, and provide more opportunities to participate in hands-on activities.

Recommendations for administration include partnering with SBAE teachers to gain a full understanding of the 3-circle model and to discuss the desired outcomes for the school farm. The SBAE teacher and administration should discuss what can successfully be maintained by the agricultural teachers and classified staff. School districts should also consider delegating school farm maintenance to other school personnel including maintenance staff and grounds keepers or hire a farm manager to relieve the impacts of barriers including the condition of the school farm, facilities, and time. Universities and secondary SBAE programs may consider partnering their pre-service teachers to manage the school farm. Universities might consider school farm management as an industry-based internship and provide credit hours toward diplomacy for completing the internship. This may provide experiential, work-based learning opportunities for university students. Relieving the SBAE teacher of time spent on the school farm dedicated to maintenance and repairs may provide support for teachers to focus on utilizing maintained facilities for instructional purposes. Many of the identified barriers can be navigated by collaborating with community members (Shoulders et al., 2011). Planning of facilities must include a program assessment of needs and community (Cooper, 1980; Nerden, 1970). SBAE advisory committees consisting of parents, community and industry personnel should review the school farm, the data from this study, and the academic goals in relation to experiential learning to make recommendations for action items to be approved by the administration, school board, or other governing boards. The group being served by the SBAE program and their specific needs should be identified (Nerden, 1970). Administration should partner with advisory board and SBAE teachers to develop a survey intended to collect information regarding student, guardian, community, and industry interests. As curriculum expands new facilities will be required (Miller, 1993) as the instructional capability of facilities influences learning (Lee, 1980). Conducting such survey may guide the selection of specific courses, project focus, and facility development based on recommendations and interest from those whom the program is ultimately serving.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Anyadoh, E. B., & Barrick, R. K. (1990). Relationship between selected teacher program and student characteristics and student scores on their supervised occupational experience program in Ohio. *Columbus: Ohio State University.* ERIC Document Reproduction Service No. Ed 324 411

Baker, D., Mehlberg, S., Patel, R., & Budge, B. (2020). *W.F. west high school CTE audit: Prepared for the Chehalis school district.* The Berc Group.

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. https://doi.org/10.5032/jae.2012.04001

Barbra, Zheadric E., (2006) *Georgia School Principals' Perceptions of the Impact of School Facilities on Student Achievement.* [Doctoral dissertation, Georgia Southern University]. Electronic Theses and Dissertations. 214. https://digitalcommons.georgiasouthern.edu/etd/214

Baxter, K., Courage, C., & Caine, K. (2015). Understanding your users: A practical guide to user research methods (Second edition.). Morgan Kaufmann. https://doi.org/10.1016/C2013-0-13611-2

Cheryan, S., Ziegler, S. A., Plaut, V. C., Meltzoff, A. N. (2014). Designing classrooms to maximize student achievement. *Policy insights from the Behavioral and Brain Sciences 1*(1), 4-12. https://doi.org/10.1177/2372732214548677

Ciot, M. G. (2009). A Constructivist Approach to Educational Action's Structure. Bulletin UASVM Horticulture, 66 (2). Electronic ISSN 1843-5394.

Cooper, E. L. (1980). Cooperative planning - A key to effective facilities. *Agricultural Education Magazine, 53*(6), 4-7. https://www.naae.org/profdevelopment/magazine/archive_issues/Volume53/v53i6.pdf

Dewey, J. (1938). Experience and education. *New York: The Macmillan Co.,* https://archive.org/details/ExperienceAndEducation-JohnDewey

Duran-Narucki, V. (2008). School building condition, school attendance, and academic achievement in New York City public schools: A mediation model. *Journal of Environmental Psychology, 28,* 278-286. https://doi.org/10.1016/j.jenvp.2008.02.008

Filardo, M., Vincent, J., Sullivan, K. (2019). How crumbling school facilities perpetuate inequality. *Phi Delta Kappan, 100*(8), 27-31. https://doi.org/10.2307/26677390

Gilbert, A. (2013). Identifying the Characteristics, Use, Perceptions, and Barriers of the School Farm (Unpublished master's thesis). *Texas Tech University, Lubbock, TX. https://ttu-ir.tdl.org/bitstream/handle/2346/48873/GILBERT*

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development. *Pearson Education.* Inc. https://learning.oreilly.com/library/view/experiential-learning-experience/9780133892512/copyright.html

Lambert, M., Stewart, J. & Claflin, K. (2018). Understanding characteristics, uses, perceptions, and barriers related to school farms in Oregon. *Journal of Agricultural Education, 59*(2), 107-214. https://doi.org/10.5032/jae.2018.02197

Lavy, S. & Nixon, J. (2017). Applications, enrollment, attendance, and student performance in rebuilt school facilities: A case study. *International Journal of Construction Education and Research, 13*(2), 125-141. https://doi.org/10.1080/15578771.2016.1245687

Lee, J. S. (1980). Facility needs. *Agricultural Education Magazine, 53*(6), 3. https://www.naae.org/profdevelopment/magazine/archive_issues/Volume53/v53i6.pdf

Lowe, D., Newcombe, P., Stumpers, B. (2013). Evaluation of the use of remote laboratories for secondary school science education. *Research in Science Education, 43*(3), 1197-1219. https://doi.org/10.1007/s11165-012-9304-3

Maxwell, L. (2016). School building condition, social climate, student attendance and academic achievement: A mediation model. *Journal of Environmental Psychology, 46,* 206-2016. https://doi.org/10.1016/j.jenvp.2016.04.009

McCarthy (1981). Vocational agricultural student benefits from agricultural activities on school farms. *Iowa State University,* College of Agriculture. https://doi.org/10.31274/rtd-180813-11054

Miller, G. M. (1993). Laboratory facilities improvement. *Agricultural Education Magazine, 65*(11), 4. naae.org/profdevelopment/magazine/archive_issues/Volume65/v65i11.pdf

Nerden, J. T. (1970). Vocational-technical facilities for secondary schools: A planning guide. *Council of Educational Facility Planners.* files.eric.ed.gov/fulltext/ED043102.pdf

Phipps, L. J., Osborne, E. W., Dyer, J. E. & Ball, A. (2008). Handbook in agricultural education in public schools (6th ed). *Clifton Park, NY: Thomas Delmar*

Piaget, J., & Rosin, A. (1977). The development of thought: equilibration of cognitive structures (A. Rosin, Trans.). Viking Press.

Roberts, T. G. (2006). A philosophical examination of experiential learning theory for agricultural educators. *Journal of Agricultural Education, 47*(1), 17–29. https://doi.org/10.5032/jae.2006.01017

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). American Association for Agricultural Education national research agenda: 2016-2020. University of Florida Department of Agricultural Education and Communication.

Shoulders, C. W., Myers, B. E. (2012). Teacher's use of agricultural laboratories, in secondary agricultural education. *Journal of Agricultural Education, 53*(2), 124-138. https://doi.org/10.5032/jae.2012.02124

Shoulders, C. W., Wilder, C., & Myers, B. E. (2011). Agricultural facilities: Experiential learning under a different roof. *The Agricultural Education Magazine, 83*(4), 12-14. https://www.naae.org/profdevelopment/magazine/archive_issues/Volume83/2011_01-02.pdf

Toombs, J.M., Eck, C. J., & Robinson, J. S. (2022). The impact of a project-based learning experience on the SAE Self-efficacy of preservice teachers. *Journal of Agricultural Education, 63*(1), 29-46. https://doi.org/10.5032/jae.2022.01029

Tucker, K. (1994). Small scale land laboratories. The Agricultural Education Magazine, *66*(10), 18-20. https://www.naae.org/profdevelopment/magazine/archive_issues/Volume66/v66i10.pdf

Twenter, J.P. & Edwards, M.C. (2017). Facilities in school-based, agricultural education (SBAE): A historical inquiry. *Journal of Agricultural Education, 58*(3), 275-292. https://doi.org/10.5032/jae.2017.03275

Uline, C., Tschannen-Moran, M., & Wolsey, T. (2009). The walls still speak: the stories occupants tell. *Journal of Educational Administration, 47*(3), 400-426. https://doi.org/10.1108/09578230910955818

Commonalities in Global Service-Learning Activities on Alumni Academic Development

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Introduction

Students need to develop cross-cultural awareness and understanding, which has led higher educational institutions (HEI) to create high-impact global programs including service-learning to enhance their academic learning. Service-learning has been part of the history of HEIs in the U.S. more than in any other region of the world (Bringle & Hatcher, 2011; Ma et al., 2019). In the U.S., service-learning and its relevance to HEIs in advancing knowledge to students were described by Eyler and Giles (1999). This scholarly book resulted from the urgency to respond to the growing number of practitioners whose outcome was not founded. The required service-learning component as part of students' courses and graduation has grown over time in the U.S. (Jones et al., 2008; Moely & Ilustre, 2011). Service-learning is relevant at the peak age of 18-23 years (Wilsey, 2013) when students are undergoing formative development, often enrolled in HEIs which are responsible for assisting in their development of cross-cultural competencies. Due to efforts to increase global competencies, HEIs have gone further to internationalize their high-impact programs. As a U.S. pedagogy, international service-learning was conceptualized as an interconnection between service-learning, study abroad, and international education (Bringle & Hatcher, 2011). Service-learning brings a study abroad program and international education into an experiential learning model for students to learn in the international community.

In this study, the service-learning program was held in Uganda and included three partner organizations. The partnership is among Makerere University (MAK), Iowa State University (ISU), and non-government organizations including Volunteer Efforts for Development Concerns (2004-2014) and Iowa State University Uganda Program (ISU-UP) in 2014 to date (Butler & Acker., 2015; Ikendi & Retallick, 2023a; 2023b). ISU-UP implements development programs of the Center for Sustainable Rural Livelihoods (CSRL) based in the College of Agriculture and Life Sciences at ISU. Service-learning is an academic program of the college led by an Associate Director of the CSRL program who is also an ISU faculty member. The service-learning program was conceptualized in 2005 out of the participatory needs assessment between the stakeholders of MAK and ISU Colleges of Agriculture and national and local entities and communities in Uganda (Nonnecke et al., 2015).

School garden programs at primary schools were determined as the most feasible activity that could fulfill the learning objectives of university students and their curricula; and meet CSRL goal of assisting in agricultural educational programs in a community that also helped to solve the undernutrition of children in primary schools with school gardens products invested in school lunches (Ikendi et al., 2023a; Nonnecke et al., 2015; 2016; Kugonza et al., 2015). School gardens were also emphasized by the FAO in the same period (FAO, 2005). Studies have assessed the

impact of the school gardening approach on nutrition adequacy (Byaruhanga, 2016); academic performance (Snodgrass, 2012); and promotion of school-based agricultural education (Ikendi., 2022a). However, research has not been conducted to assess the impact of a service-learning, school gardens approach on the academic development of university students who participated in programs since 2006. This study aimed to assess the academic development of university students, conceptualized as students' learning from school gardens and related activities.

Theoretical Framework

This study was grounded on experiential learning theory (Kolb, 2015), with the service-learning activities implemented through the school garden and related community activities. Experiential learning highlights the fundamental role that experience plays in the learning process, "the process whereby knowledge is created through the transformation of experience" (Kolb, 2015, p. 49). Experiential learning embraces an involvement in specific experiences, reflecting on them, intellectualizing those experiences, and actively participating in experimenting with those experiences. Kolb (2015) describes that learners' prior knowledge and perceptions about the learning activities impact how they interpret their current experiences. If a learner has a specific experience with a learning activity, it provides a basis for their learning. The learner then looks at this experience, observes it, reflects on it, and responds to it. These observations are integrated into a theoretical framework that relates to other ideas in their previous experience.
Kolb (2015) states that mere perception of experience alone is not enough to effect learning; it is rather that something must be accomplished with that experience – work must be done, for instance, on a given project. In the same instance, Kolb indicates that the transformation of experiences cannot only signify learning, for there must be something to be transformed, some state or experience that is being acted upon. To Kolb, learning occurs when a concrete experience is expanded with reflection and observation, formed on abstract concepts and generalizations, and tested in new situations. In experiential learning theory, learning is a process than an outcome, learners learn and re-learn from their experience with hands-on activities resulting in mastery of concepts through assimilation and accommodation processes. Learning outcomes represent historical records gained from the experience while performing the activities. The praxis of experiential learning requires a preflection stage to provide a starting point for Kolb's experiential learning cycle, without necessarily beginning with the experience itself (Jones & Bjelland, 2004). The experiential learning cycle requires a cognizant assessment of the learners' pre-existing perceptions and/or biases that are likely to impact the learning process. Students who participate in the different service-learning programs in Uganda are oriented on how project activities are implemented through school gardens and related activities (Ikendi et al., 2022a; Ikendi, 2023; Nonnecke et al., 2015). These orientations provide an overview of the school gardens and related program activities, whom, and how activities are implemented before the start of their service-learning experiences which influences their participation and learning.

Purpose and Main Research of the Study

Studying abroad has grown over the past three decades (Opendoors, 2023) which led to an increase in their efforts toward assessment and accountability (Bringle & Hatcher, 2011). This study aligns with the second goal of the U.S. agriculture education research agenda of 2016-2020 on "what evaluation methods, … are effective in determining the impacts of educational

programs …?" (Thoron et al., 2016, p. 41). The most popular academic program assessments are surveys conducted among alumni (Miller et al., 1998). The central purpose of this study was to determine the level of influence of Uganda service-learning program activities on the academic development of the alumni. The primary question was: Are there commonalities in the Uganda service-learning program activities that influenced the academic development of the alumni?

Methodology

This study was part of a larger census study that investigated the impact of the Uganda service-learning program on the development of the alumni (Ikendi, 2022b). The study utilized an e-mail and survey system through Qualtrics in data collection. The population consisted of 291 (i.e., 166 [MAK], 125 [ISU]) service-learning alumni. The alumni represented all university student participants who completed the summer semester named, Creating a school garden: Service-learning in Uganda, held in the Kamuli District, between 2006-2019. The alumni were identified from the program's database through the Associate Director, Education Programs of the CSRL. Email addresses were updated by the investigators.

The survey design followed the guidelines of Dillman et al. (2014) using a Tailored Design Method (TDM) of customization of the survey mode to reduce errors, adopt multiple contacts, and focus the content on the study goal. For this paper, we used two questions; a dichotomous questions sought to identify alumni's university during service-learning; and a scale question used a six-point Likert question with 12 Likert items (i.e., service-learning activities) measuring alumni's agreement with the level of influence on how the activity influenced their academic development. The scale was composed of "0=Did not participate; 1=Not at all influential" through "5=Extremely influential." The option for "Did not Participate" was added since not all alumni completed all activities across the years because of the developments in the program.

The design of the main survey instrument followed systematic and rigorous steps to ensure that the final survey instrument was valid and once deployed, ensured data collected were consistent with the study objectives. The instrument was reviewed by a team of 12 members with different experiences and specialties in higher education, and research methods. These included five professors from ISU, two from Uganda, and five Ph.D. students. The systematic review followed the authors' designed panel of expert guidelines aimed at identifying whether each item in the instrument was: i) relevant to the objective of the study, ii) clear and concise, iii) not multi-barreled, and iv) free of technical jargon. All items were modified as needed and retained.

Following Dillman et al. (2014) TDM, an invitation letter was sent on February 7, 2022, to all 291 alumni in a single e-mail informing them about the upcoming survey. The letter stated the purpose and the importance of their participation. Of 291 alumni, 17 had failure delivery emails; we settled with 274 alumni for the remainder of the survey. On February 9, an initial link was sent through Qualtrics to 274 alumni with a cover letter explaining the research purpose, a request for timely responses, and thanking them for their willingness to participate. Consent was embedded in the first question where alumni who chose to participate, clicked "Yes" and continued. All sections were marked, and directions were provided on each question. Three follows were sent on February 18, 28, and March 7, and data collection was closed on March 10, 2022, with an overall response rate of 94.2%, MAK at 95.6%, and ISU at 92.2%. We deployed Cronbach's alpha to establish reliability; a .893 alpha was established which shows a strong internal consistency for the 12 service-learning activities with 71.0% usable responses.

Data were cleaned and analyzed using IBM-SPSS 28. A Principal Components Analysis (PCA), an exploratory multivariate statistical tool based on variance maximizing rotation [Varimax] (Kaiser, 1960), was used to determine the commonalities among the service learning activities that influenced the alumni's academic development. The PCA extracted components that showed commonality between activities and their influence on the academic development of the alumni. Components were categorized based on Kaiser criteria where only activities with an Eigenvalue greater than one were considered significant. The results are presented in a table with factor loadings for final rotated components, extracted commonalities, and overall Kaiser-Meyer-Olkin (KMO) and Bartlett's test measure of sampling adequacy.

Findings

Alumni participated in 12 major activities of the Uganda service-learning, which had different levels of influence and commonalities on their academic development. A Principal Components Analysis generated three components (Table 1) in a Varimax converged in five alterations.

Table 1
Factor Loadings for Final Rotated Component Matrix Showing the Commonalities.

Uganda Service-learning Activities	MAK-ISU Loading			ISU Only Loading			MAK Only Loading		
	1	2	3	1	2	3	1	2	3
School gardening	0.855			0.881			0.826		
Bi-national projects	0.752			0.688			0.781		
Arrival orientations	0.656			0.670			0.684		
Farmer field visits	0.621			0.577			0.660		
School teaching	0.555			0.614			0.446		
Journaling/logbook		0.844			0.845				0.754
Critical reflections		0.833			0.847				0.793
Presentations		0.800			0.767				0.764
Pre-departures		0.473		0.535				0.600	
Co-curriculars			0.815			0.815		0.697	
Tours and travels			0.801			0.828		0.855	
Social parties			0.752			0.798		0.670	

Combined MAK-ISU KMO and Bartlett's test = .869; χ^2 = 1012.287; *df* = 66; and *p* = <.001.

Overall, with MAK-ISU combined, the cumulative rotation sums of squared loadings (CRSSL) were 66.4% with component 1 accounting for the largest proportion (46.4%); and 10.5 and 9.5 percent for components 2 and 3 respectively. A total of five activities were loaded on component 1, which showed a higher commonality in influencing alumni's academic development. School gardening and bi-national team projects had the highest factor loading followed by arrival orientations, farmer field visits, and school teaching. Component 2 had four factors that showed commonality including journaling and logbooks, critical reflections, and presentations with higher loading compared to pre-departure orientation with a 0.473 loading, lower than the 0.500 set criteria for inclusion in the analysis (Kaiser, 1960). The third component had three factors

that loaded together depicting commonality in influencing alumni academic development including co-curricular activities, tours and travels, and social parties.
From individual universities, ISU had a CRSSL of 66.8% with components 1, 2, and 3 accounting for 45.6, 10.8, and 10.4 percent respectively, whereas MAK had a CRSSL of 62.6% with components 1, 2, and 3 accounting for 41.5, 11.4, and 9.7 percent respectively. School teaching exhibited a weaker loading in component 1 for MAK only but strongly loaded on MAK-ISU and ISU only. Pre-departure orientations loaded strongly in component 1 for ISU only; in MAK only and MAK-ISU, it loaded strongly with the former and weaker with the latter. For components 2 and 3, MAK-ISU and ISU only had similar factors loading, but MAK only exhibited a reversed loading where factors that loaded on components 2 and 3 for MAK-ISU and ISU only loaded on components 3 and 2 respectively for MAK only.

Discussion, Conclusions, Implications, and Recommendations

The study sought to determine what commonalities exist among the Uganda service-learning activities that influenced the academic development of alumni. A PCA generated three aspects including 1) community engagement and reciprocity, 2) cognitive development, and 3) socialization. The first aspect of community engagement and reciprocity showed commonality among activities including school gardening, bi-national team projects, arrival orientations, farmer field visits, and school teaching. These activities portrayed the engagements of students with communities which promoted reciprocal learning – an interface that describes students learning from the communities and communities learning from students (Ikendi et al., 2023b). The second aspect of cognitive development which loaded activities of journaling and logbook writing, critical reflections, and presentations depicted the reflexive actions of the alumni on fieldwork activities. These reflexive activities provided for the cognitive development of alumni while documenting and confronting their assumptions and perceptions about the learning activities through rigorous critical thinking and sharing of their learned lessons (Ash & Clayton, 2009; Chapman, 2018; Ikendi et al., 2022b; Molee et al., 2010; Sturgill & Motley, 2014). These activities helped learners to gain and share their insights into how the activities were completed and what lessons were learned. Also, these activities showed how projects could be sustained through working with pupils in school gardens, building their capacity to manage their projects. The third aspect of service-learning that contributed to academic development of alumni was socialization which loaded co-curricular activities, tours and travels, and social parties. These activities depicted the social life of alumni through adventures and leisure (Ikendi et al., 2022c; Jarvis & Peel, 2008; Nawijn et al., 2010). Activities of this nature managed the fatigue of students after fieldwork which also provided opportunities to learn about peers' unique talents and cultures after field activities and learn about and from nature and the environment in tours. A bi-national service-learning program can have an impact on academic development of students as provided in alumni's feedback. These results have implications for delivering global service-learning and undergraduate programs. There is value to both students from the visiting and host country, and planned activities should intentionally develop multinational teams. Program planners should consider three types of activities to ensure a well-rounded experience occurs with a deep level of learning. Two activities are in the service-learning name; students should have various opportunities to provide service, and learning elements be included. The third activity is the social aspect where students engage in co-curriculars, tours, and social events.

Global service-learning programs should involve pre-departure orientations to bridge the gap between activities and learning during actual implementation (Gouldthorpe et al., 2012; Harder et al., 2012; Jones & Bjelland, 2004; Ikendi et al., 2022a; Ikendi, 2023). Conducting pre-departure orientations with experienced facilitators and guest speakers, such as program alumni, provide relevant experiences that students are likely to go through which increases their eagerness to participate in the programs. These exercises help students compare their prior perceptions with those after participating in orientations, and after the field trips to make informed judgments that are helpful for their post-service-learning understanding.

References

Ash, S. L., & Clayton, P. H. (2009). Generating, deepening, and documenting learning: The power of critical reflection in applied learning. *Journal of Applied Higher Education, 1*(1), 25-48. https://files.eric.ed.gov/fulltext/EJ1188550.pdf

Bringle, R. G., & Hatcher, J. A. (2011). International service-learning. In R. G. Bringle, J. A. Hatcher, & S. G. Jones, (Eds.), *International service-learning: Conceptual frameworks and research* (pp. 3-28). Stylus.

Butler, L., & Acker, D. (2015). Epilogue: The partnership today and looking towards the future. In L. Butler & D. McMillan, (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp 255-268). Kumarian.

Byaruhanga, L. A. (2016). *Effect of school garden food production on nutrient adequacy and nutrition status of children in Namasagali primary school in rural Kamuli District, Uganda* [Master's Thesis, Kenyatta University]. Master's Theses and Dissertations. http://ir-library.ku.ac.ke/handle/123456789/17759

Chapman, D. D. (2018). The ethics of international service-learning as a pedagogical development practice: A Canadian study. *Third World Quarterly*, *39*(10), 1899-1922. https://doi.org/10.1080/01436597.2016.1175935

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method*. John Wiley & Sons.

Eyler, J., & Giles, D. E. (1999). *Where's the learning in service-learning*. Jossey-Bass.

Food and Agriculture Organization (FAO). (2005). *Setting up and running a school garden. A manual for teachers, parents and communities*. FAO, Rome, Italy. https://www.fao.org/3/a0218e/a0218e.pdf

Gouldthorpe, J. L., Harder, A., Stedman, N. L., & Roberts, T. G. (2012). Steps toward internationalization in undergraduate programs: The use of preflective activities for faculty international experiences. *Journal of International Agricultural and Extension Education*, *19*(1), 30-41. https://doi.org/10.5191/jiaee.2012.19105

Harder, A., Lamm, A., Roberts, T. G., Navarro, M., & Ricketts, J. (2012). Using a preflective activity to identify faculty beliefs prior to an international professional development experience. *Journal of Agricultural Education*, *53*(4), 17-28. https://doi.org/10.5032/jae.2012.04017

Ikendi, S. (2022a, May 16-19). *Developing school-based agriculture education through school gardens* (Poster Abstract). National American Association for Agricultural Education Conference. Oklahoma City, OK. http://aaae.agedweb.org/downloadfile.asp?ID=4996

Ikendi, S. (2022b). *Exploring changes in academics, skills, and intercultural competence development of global service-learning students* [Doctoral Dissertation, Iowa State University]. Graduate Theses and Dissertations. https://dr.lib.iastate.edu/handle/20.500.12876/JvNVO1Xv

Ikendi, S. (2023, May 15-18). *An inquiry into preflections on students' participation in global service-learning* (Poster Proceedings, pp. 370-373). The 2023 National American Association for Agricultural Education Conference. Raleigh, NC. https://aaaeonline.org/resources/Documents/National/2023Meeting/2023%20AAAE%20Poster%20Proceedings.pdf

Ikendi, S., & Retallick, M. (2023a, May 15-18). *Improving managerial and leadership effectiveness in multistakeholder organizations* (Paper Proceedings, pp. 636-655). The 2023 National American Association for Agricultural Education. Raleigh, NC. https://aaaeonline.org/resources/Documents/National/2023Meeting/23_AAAE_Proceedings_combined_FINAL.pdf

Ikendi, S., & Retallick, M. (2023b, April 26-29). *Exported through the theory of change: An inquiry into the compatibility of the U.S. land grant philosophy in Uganda* (Proceedings, pp. 358-361). International Agricultural and Extension Education. Guelph, Canada. https://www.aiaee.org/resources/Documents/2023%20AIAEE%20Conference%20Proceedings%20Final.pdf

Ikendi, S., Retallick, M., & Nonnecke, G. (2022a, October 6-8). *Pre-departure orientations: The architectural founding of learning in global service-learning* (Poster Proceedings, pp. 56-61). The 2022 North Central Region of the American Association for Agricultural Education Research Conference. Columbia, MO. https://aaaeonline.org/resources/Documents/North%20Central/2022Conference/2022Conference/2022%20NCAAAE%20Research%20Poster%20Proceedings.pdf

Ikendi, S., Retallick, M., & Nonnecke, G. (2022b, October 6-8). *Critical reflections: A gold standard measure in global service-learning programs* (Paper Proceedings, pp. 31-37). The 2022 North Central Region of the American Association for Agricultural Education Research Conference. Columbia, MO. https://aaaeonline.org/resources/Documents/North%20Central/2022Conference/2022Conference/2022NC-AAAEResearchPresentationsProceedings[6].pdf

Ikendi, S., Retallick, M., & Nonnecke, G. (2022c, May 16-19). *Measuring global service-learning alumni Facebook communication* (Poster Abstract). The 2022 National American Association for Agricultural Education Conference. Oklahoma City, OK. http://aaae.agedweb.org/downloadfile.asp?ID=5017

Ikendi, S., Retallick, M., Nonnecke, G. (2023a). Implementing global service-learning through school garden. *The Agriculture Education Magazine 95*(6), 25-28. https://www.naae.org/profdevelopment/magazine/archive_issues/Volume95/2023%2005%20--%20May%20June.pdf

Ikendi, S., Retallick, M., & Nonnecke, G. (2023b, April 26-29). *Fostering community reciprocal learning through farmer field visits with global service-learners* (Proceedings, pp. 334-337). International Agricultural and Extension Education. Guelph, Canada. https://www.aiaee.org/resources/Documents/2023%20AIAEE%20Conference%20Proceedings%20Final.pdf

Jarvis, J., & Peel, V. (2008). Study backpackers: Australia's short-stay international student travelers. In K. Hannam, & I. Ateljevic, (Eds.), *Backpacker tourism: Concepts and profiles* (pp. 157-173). Channel View Publications.

Jones, L., & Bjelland, D. (2004). *International experiential learning in agriculture* (Conference Proceedings, pp. 963-964). The 20th Annual Conference, Association for International Agricultural and Extension Education. Dublin, Ireland.

Jones, S. R., Segar, T. C., & Gasiorski, A. L. (2008). A double-edged sword: College student perceptions of required high school service-learning. *Michigan Journal of Community Service Learning, 15*(1), 5-17. https://files.eric.ed.gov/fulltext/EJ831379.pdf

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141-151. https://doi.org/10.1177/001316446002000116

Kolb, D. A. (2015). *Experiential learning: Experience as a source of learning and development*. Prentice-Hall.

Kugonza, D., Masinde, D., Nonnecke, G., & Acker, D. (2015, March 3-6). *Solving the invisible hunger crisis among school children through service-learning: A case study from Kamuli, Uganda* (Conference Proceedings). International Congress, Hidden Hunger 2015 Conference. Stuttgart, Germany.

Ma, C., Chiu., T, & Tai, L. W. (2019). Service-learning in Asia. *Engaging Communities in East Asia 30*(3), 3-9. https://doi.org/10.18060/23515

Miller, W. W., Williams, D. L., Bekkum, V. A., & Steffen, R. W. (1998). The follow-up survey as a student outcome assessment method: Some procedures and examples. *NACTA Journal*, *42*(3), 40-46. http://www.jstor.org/stable/43765274

Moely, B. E., & Ilustre, V. (2011). University students' views of a public service graduation requirement. *Michigan Journal of Community Service Learning, 17*(2), 43-58. https://files.eric.ed.gov/fulltext/EJ967606.pdf

Molee, L. M., Henry, M. E., Sessa, V. I., & McKinney-Prupis, E. R. (2010). Assessing learning in service-learning courses through critical reflection. *Journal of Experiential Education*, *33*(3), 239-257. https://doi.org/10.5193/jee33.3.239

Nawijn, J., Marchand, M. A., Veenhoven, R., & Vingerhoets, A. J. (2010). Vacationers happier, but most not happier after a holiday. *Applied Research in Quality of Life*, *5*(1), 35-47. https://doi.org/10.1007/s11482-009-9091-9

Nonnecke, G., Masinde, D., Byaruhanga, L., Lutwama, D., & Acker, D. (2016, September). *Using school gardens to support school feeding programs at elementary schools in Uganda*. In *HortScience 51*(9), S370-S370. American Society of Horticultural Science. Alexandria, VA.

Nonnecke, G., McMillan, D. E., Kugonza, D., & Masinde, D. (2015). Leaving the doors open to new beneficiaries. In L. M. Butler & D. E. McMillan. (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp 165-189). Kumarian.

Opendoors (2023). *U.S. study abroad*. Institute of International Education, Inc. https://opendoorsdata.org/annual-release/u-s-study-abroad/

Snodgrass, N. A. (2012). *The impact of a school garden program on agriculture learning by primary school children in rural Uganda* [Master's Thesis, Iowa State University]. Graduate Theses and Dissertations. https://dr.lib.iastate.edu/handle/20.500.12876/26657

Sturgill, A., & Motley, P. (2014). Methods of reflection about service-learning: Guided vs. free, dialogic vs. expressive, and public vs. private. *Teaching and Learning Inquiry: The ISSOTL Journal*, *2*(1), 81-93. https://doi.org/10.20343/teachlearninqu.2.1.81

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, *48*(6), 1273-1296. https://doi.org/10.1007/s11165-016-9602-2

Thoron, C. A., Myers, E. B., & Barrick, R. K. (2016). Research priority 5: Efficient and effective agricultural education programs. In G. T. Roberts., A. Harder., & T. M. Brashears, (Eds.), *American association for agricultural education national research agenda: 2016-2020* (pp. 41-48). Gainesville, FL: Department of Agricultural Education and Communication.

Wilsey, S. A. (2013). Comparisons of adult and traditional college-age student mothers: Reasons for college enrollment and views of how enrollment affects children. *Journal of College Student Development*, *54*(2), 209-214. https://doi.org/10.1353/csd.2013.0018

Does Participation in Livelihood Education Programs Improve Household Food Security?

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Introduction

Uganda, our case study, is among the nations rated as serious in hunger severity on the global hunger index (von Grebmer et al., 2022). The agricultural sector, her backbone is dominated by small landholder farmers who operate at a subsistence level (UBOS, 2016). Low food production explains the high levels of food and nutrition insecurity, and the prediction of the "current path scenario" indicates that Uganda may not achieve food security by 2050 (Hedden et al., 2018). The Ugandan government and stakeholders have tried various approaches to promote food production. In early 2000s, for instance, one of the approaches was proposed by the Ministers of Health and Agriculture who appealed to the public including NGOs and government organs to pass the Uganda Food and Nutrition Strategy (MAAIF & MoH, 2004). Upon its passage, an investment plan was drafted and the line Ministries including Health, Agriculture, Finance, Land, Justice, …, and the Office of the Prime Minister committed full support to its implementation. Part of the strategies included the promotion of public-private partnerships, a strategy adopted by Iowa State University (ISU) through its Center for Sustainable Rural Livelihoods (CSRL) in 2003 geared towards ending hunger in rural Uganda (Butler & McMillan, 2015; Ikendi & Retallick, 2023a). The CSRL operates in a three-partner model with Makerere University and local NGOs including the Volunteer Efforts for Development Concerns (2004-2014); and ISU Uganda Program (ISU-UP), 2014 to date (Butler & Acker, 2015; Ikendi & Retallick, 2023b). Between 2004-2014, CSRL adopted a farmer-to-farmer model by forming food security groups to harness livelihood capital for growth (Masinde et al., 2015a; Sseguya et al., 2015). Since 2014, CSRL/ISU-UP adopted a comprehensive lifespan capacity development model (Ikendi, 2019, p. 49-64), an approach that touches the lives of people from pregnant to seniors through different livelihood education programs (LEPs) that build their capacity for behavioral changes. The LEPs include agronomy and land use programs that focus on improving access to crop production knowledge, quality and diverse crop inputs; and the grain storage and postharvest programs help reduce postharvest losses in schools and communities (Ikendi et al., 2023a). Livestock integration targets to increase the consumption of animal proteins, enhance income, and improve breeding stock (Masinde et al., 2015b). The community innovations program aims at diversifying the incomes of malnutrition rehabilitated mothers, and in and out-of-school youth through several projects including crafts, saving schemes, sewing, books and soap making, school gardens, and livestock projects to build their livelihood assets (Martin, 2018). The food and nutrition security support groups work to improve food and nutrition security amongst rehabilitated mothers through provision of technical support and initiation of sustainable food production and income-generating activities. Education programs strive to build the capacity of young program participants through global service-learning using school gardening (Ikendi 2022a; 2022b; Ikendi et al., 2022; 2023b; 2023c; Nonnecke et al., 2015). Youth entrepreneurship

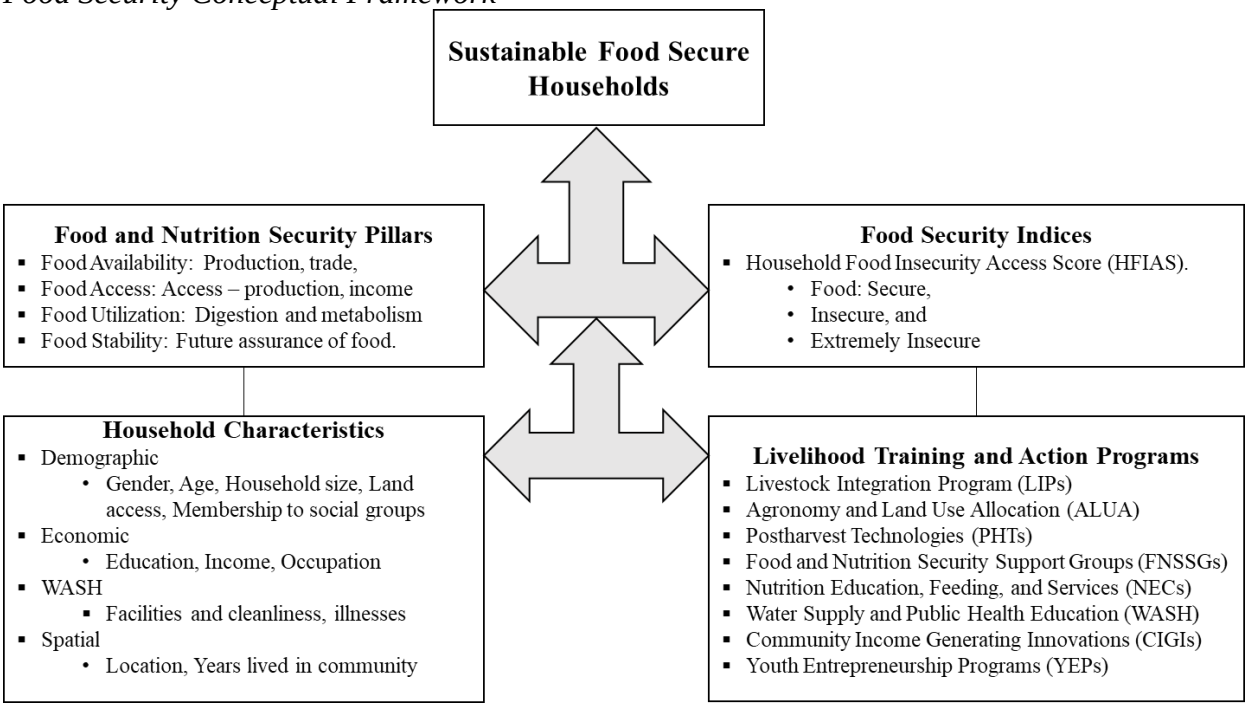
aims at increasing the knowledge and skills of youth in managing small – medium enterprises to expand their livelihood strategies. All these programs directly impact food production. Similarly, nutrition and infant feeding programs address nutrition challenges through a community-based approach to management of malnutrition. The program uses nutrition education centers (NECs) to improve the nutritional health of children (0-59 months) and reproductive mothers by promoting behavioral changes in maternal, reproductive health, and feeding practices (Ikendi et al., 2023d; Masinde et al., 2015b). NECs provide complementary services including therapeutic porridge, work with Nurses to assist in clinic days - immunization, HIV testing and counseling, and family planning. The program enhances school lunches using proceeds from school gardens (Byaruhanga, 2016). The water and public health programs work to increase access to safe water and improve community health and sanitation practices (Ikendi et al., 2023d). These programs influence the food utilization concept of nutrition security.

Conceptual Framework

Food-secure households are those who have consistent access to foods to meet their nutritional demands for a physically, economically, and socially healthy life (CFS, 2012; FAO et al., 2013). Households also require to be nutritionally secured – hence the term food and nutrition security (FNS) which includes all elements of food security coupled with conducive clean environments, reducing household disposition to diseases. The FNS concept is comprised of four core pillars, including availability, access, utilization, and stability which work in synergy for a sustainable FNS state in its entirety (CFS, 2012; FAO et al., 2013). Food security focuses on availability and access, while nutrition security focuses on food utilization in our bodies. Food stability relates to future assurances of food. This study focused on food access and deployed a conceptual framework (Figure 1) to identify the pathways to household FNS through participation in LEPs.

Figure 1

Food Security Conceptual Framework



Starting from where the communities are (Masinde & McMillan, 2015; Ikendi & Retallick, 2023a), the framework shows how household characteristics influence their participation in LEPs. It illustrates the approaches to FNS and points out the intersection between the confounding variables (household characteristics) having an influence both on the participation in LEPs and directly on food security. Interventions need to understand the nature of the community where they operate. Lanou et al. (2021) also echoed the vital role of meeting and starting from where people are in promoting a behavioral change in food-eating patterns.

Purpose of the Study

The purpose of this study was to determine whether participation in the LEPs impacted the food security status of small landholder households in Kamuli district, Uganda. Specifically, the study compared the food security status of LEPs participants to that of non-participants.

Methodology

This comparative study was conducted in Kamuli, Uganda where CSRL implements LEPs to end hunger. The program participants were current and rehabilitated NEC clients or had participated in any other LEPs, while non-participants should not have participated in any program activities implemented by the CSRL/ISU-UP. The NECs are community-based centers where at-risk for malnutrition breastfeeding and pregnant mothers; and children of 0-59 months of age are enrolled to be rehabilitated through nutrition therapy (Ikendi, 2019, pp. 52-64). The sampling frame for program participants was the 1,503 households served by the NECs since 2014. Using a 95% confidence interval with a 5% margin of error, we established a sample size of 306 potential participants who were randomly drawn from the list provided to us by the program. Approval to conduct the study was obtained #IRB-18-356-01 at ISU. Participants were presented with the consent forms, read in "Lusoga" a native language of the Co-PI and research assistants. The Community-based NEC trainers assisted in identifying the NEC households. Out of the sample of 306 households, 253 (82.7%) were accessed. The study sought to sample one non-NEC household within a quarter-mile radius of an NEC household. However, 201 households accepted to participate, giving a total of 454 households. Out of the 201 non-NEC households, 63 households that had participated in other LEPs were disaggregated and labeled as "Participants: Non-NEC Clients." The remaining 138 households who had never participated in any of the LEPs were categorized as "Non-Program Participants" and served as the comparison group.
To determine food access, the Household Food Insecurity Access Scale (HFIAS), which focuses on the relative situation of lack of food in the four weeks before the survey was employed (Coates et al., 2007). The index utilizes nine sets of questions that ask whether the situation occurred and its relative rate of frequency of occurrence. Question 1(a), for instance, asks: In the past four weeks, did you worry that your household would not have enough food? if the response is "No" skip to question 2, but if the response is "Yes", go to question 1(b). How often did this happen in the past four weeks? Where 1=Rarely (once or twice), 2=Sometimes (three to ten times), or 3=Often [more than ten times] (Coates et al., 2007, p. 4). Determination of food security status is based on summing up the frequency indices where: "0=None, 1=Rarely, 2=Sometimes, and 3=Often" generating a minimum of 0 and a maximum of 27 points for all the nine questions. A three-equal cluster is generated with points: 0.0–9.0 as Food Secure, 9.1–18.0

as Food Insecure, and 18.1–27.0 as Extremely Food Insecure. We determined the association and differences in food security status between households using a chai square and ANOVA at 0.05.

Results

Food security status varied among and between households both by affiliation with the NECs and participation in the LEPs. In Table 1, the HFIAS index score revealed that 46.3, 45.4, and 8.4 percent of households were food: secure, insecure, and extremely food insecure respectively.

Table 1

Percentage and Mean Comparison of Household Food Security Status.

Household Food Security Status as Measured by the HFIAS Index Scores	NEC Households (*n*=253)	Non-NEC Households (*n*=63)	Non-Participants (*n*=138)	Overall Households (*n*=454)	*P*-Value
Food Secure	47.8	63.5	35.5	46.3	
Food Insecure	45.5	28.6	52.9	45.4	0.003
Extremely Food Insecure	06.7	07.9	11.6	08.4	
ANOVA *post hoc* for HFIAS	9.54^{b}±6.15	7.19^{a}±7.33	10.94^{b}±6.32	9.64±6.47	<0.001

Superscripts **a & b** depict significant differences in mean scores between groups for the HFIAS.

Overall, all 454 households were ranked as food insecure. However, a *post hoc* analysis revealed that LEPs participants who are Non-NEC clients were overall food secure. But participants who are NEC clients and Non-participants were not different from each other, both were overall food insecure. When merged, the NEC clients and Non-NEC clients represent CSRL/ISU-UP LEPs households in this study. A cross-tabulation revealed that LEPs participants were 51.0% more likely to be food secure compared to 35.5% of non-participants in Kamuli district, Uganda.

By program, (Table 2) agronomy and postharvest, and livestock integration had a significant relationship with households being food secure than non-participants in those specific programs.

Table 2

Relationship Between Participation in LEPs and Household Food Security Status

Livelihood Education Programs	Household Food Security Status	Non-Participants		LEPs Participants		*P*-Value (χ^2)
		f	%	*f*	%	
Agronomy and Postharvest	Food Secure	86	36.6	124	56.6	<0.001
	Food Insecure	121	51.5	85	38.8	
	Ext. Food Insecure	28	11.9	10	4.6	
Livestock Integration	Food Secure	109	38.9	101	58.0	<0.001
	Food Insecure	143	51.1	63	36.2	
	Ext. Food Insecure	28	10.0	10	5.7	
Nutrition and Infant Feeding	Food Secure	91	44.2	119	48.0	0.141
	Food Insecure	92	44.7	114	46.0	
	Ext. Food Insecure	23	11.2	15	6.0	
Water and Public Health	Food Secure	91	44.6	119	47.6	0.130
	Food Insecure	90	44.1	116	46.4	
	Ext. Food Insecure	23	11.3	15	6.0	
Complementary Services	Food Secure	75	43.9	135	47.7	0.393
	Food Insecure	78	45.6	128	45.2	
	Ext. Food Insecure	18	10.5	20	7.1	
	Food Secure	194	45.8	16	53.3	0.218

Community Income Generating Innovations	Food Insecure	192	45.3	14	46.7
	Ext. Food Insecure	38	9.0	-	-

Discussions, Conclusions, Implications, and Recommendations

The findings attach a significant role of livelihood programs in improving food and nutrition security. These results match those established by (Seguya et al., 2018), where households who participated in the CSRL/VEDCO program between 2004-2008 in Kamuli were 63.1% more food secure than 38.4% food secure non-participants. In 2004, the CSRL baseline data revealed a 9.0% food-secure status, five years after the interventions through the farmer-farmer extension model, food-secure rose to 53.7% by 2008 (Seguya et al., 2018). It rose further to 61.1% by 2015 at the inception of CSRL/ISU-UP partnership through a comprehensive capacity development. Whereas we observe a reduction in the proportion of food-secure from 61.1% in 2015 to 46.3% by 2018, we see a similar global trend with a switch from MDGs to SDGs. FAO et al. (2020, p. 1) report that "five years after the world committed to ending hunger … we are still off track to achieve this objective by 2030". The same sentiments are echoed in the "current path scenario" projections (Hedden et al., 2018). Sustaining gains requires bolstering partnerships with NGOs, effective leadership, supervision, administration, and management (Ikendi & Retallick, 2023b). Nevertheless, by program, participation in the agronomy and postharvest, livestock integration significantly influenced households being food secure. These programs directly contribute to food availability and access through direct production and/or sale of output to purchase foods. They also increase farmgate dietary diversity which helps to improve dietary and caloric consumption (Islam et al., 2018; Koppmair et al., 2017; Sekabira & Nalunga, 2020) which are alternative measures of food security (Swindale & Bilinsky, 2006). The households in agronomy benefit from extension education and planting materials like soybean, amaranths, bananas, millet, and Vitamin A sweet potatoes, among others (Ikendi et al., 2023a). Similarly, those in postharvest have access to silos, tarpaulins, and grain cleaners at subsidized prices from the program. In livestock integration, in addition to extension education on their management, households also have access to veterinary services including vaccinations and treatment of their animals. Depending on available funds, trained households are supported with inputs like building materials (e.g., cement, iron sheets), layer chicks, kuroilers, ducks, breeding goats, pigs, forage seeds, feeds and ingredients, and water tanks to improve household water access.

On the other hand, participation in water and public health; nutrition and infant feeding; complementary services (like therapeutic porridge, assistance with immunization, family planning, HIV/AIDS testing and counseling); and income-generating innovations also had a positive association with households being food secure. These programs, other than income innovation, influence the health and well-being of households which has a high multiplier effect in influencing food utilization, a concept of nutrition security, and behavioral change toward healthy living (Ikendi et al., 2023d; Winham et al., 2016). Income innovations by their nature of operations contribute to food availability, access, stability, and a move towards sustainability of the households. The innovations program is mainly composed of households who have gone through malnutrition rehabilitation and are set to engage in income activities to support families. This study recommends that households should engage more in LEPs to build their capacity in managing their different enterprises. Different programs have different learning aspects, for instance, learning about land-sparing techniques of production like a sack, kitchen, and keyhole

gardens for the production of micronutrient vegetables solves the problem of land and nutrition deficiency (Ikendi et al., 2023a; Masinde & McMillan, 2015). Infant feeding practices to help in managing malnutrition (Ikendi et al., 2023d). Techniques in construction and managing WASH facilities like latrines, bathrooms, kitchens, tippy taps, rubbish, and plate stands to enhance public health and reduces household exposure to WASH-related diseases (Ikendi et al., 2023d). These engagements improve social capital, an asset of food security (Seguya et al., 2018) and reciprocal learning from extensionists-community relationship (Ikendi et al., 2023e).

References

Butler, L. M., & Acker, G. D. (2015). Epilogue: The partnership today and looking towards the future. In L. M. Butler & D. E. McMillan, (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp. 255-268). Kumarian.

Butler, L. M., & McMillan, D. E. (2015). *Tapping philanthropy for development: lessons learned from a public-private partnership in rural Uganda*. Kumarian.

Byaruhanga, L. A. (2016). *Effect of school garden food production on nutrient adequacy and nutrition status of children in Namasagali primary school in rural Kamuli District, Uganda* [Master's Thesis, Kenyatta University]. Master's Theses and Dissertations. http://ir-library.ku.ac.ke/handle/123456789/17759

Coates, J., Swindale, A., & Bilinsky, P. (2007). *Household food insecurity access scale (HFIAS) for measurement of food access: Indicator guide*. FANTA Project: Washington DC. https://www.fantaproject.org/sites/default/files/resources/HFIAS_ENG_v3_Aug07.pdf

Committee on World Food Security [CFS]. (2012). *Coming to terms with terminology: Food security, nutrition security, food security and nutrition, and food and nutrition security.* FAO: Rome, Italy. https://www.fao.org/3/MD776E/MD776E.pdf

Food and Agriculture Organization [FAO]., International Fund for Agricultural Development [IFAD]., & World Food Program [WFP]. (2013). *The state of food insecurity in the world 2013. The multiple dimensions of food security.* Rome, Italy. https://www.fao.org/3/i3434e/i3434e.pdf

Food and Agriculture Organization of the United Nations [FAO]., International Fund for Agricultural Development [IFAD]., United Nations Children's Fund [UNICEF]., World Food Program [WFP]., & World Health Organization [WHO]. (2020). *The state of food security and nutrition in the World 2020. Transforming food systems for affordable healthy diets*. FAO: Rome, Italy. https://doi.org/10.4060/ca9692en

Hedden, S., Rafa, M., & Moyer, J. D. (2018). *Achieving food security in Uganda*. USAID. http://drupalwebsitepardee.s3.amazonaws.com/pardee/public/Pardee_Food_Security_report_v1.pdf

Ikendi, S. (2019). *Impact of nutrition education centers on food and nutrition security in Kamuli District, Uganda* [Masters' Thesis, Iowa State University]. Graduate Theses and Dissertations. https://lib.dr.iastate.edu/etd/17032/

Ikendi, S. (2022a). *Exploring changes in academics, skills, and intercultural competence development of global service-learning students* [Doctoral Dissertation, Iowa State University]. Graduate Theses and Dissertations. https://dr.lib.iastate.edu/handle/20.500.12876/JvNVO1Xv

Ikendi, S. (2022b, May 16-19). *Developing school-based agriculture education through school gardens* (Poster Abstract). National American Association for Agricultural Education Conference. Oklahoma City, OK. http://aaae.agedweb.org/downloadfile.asp?ID=4996

Ikendi, S., Retallick, M., & Nonnecke, G. (2022, May 16-19). *Solving community problems through bi-national global service-learning projects* (Poster Abstract). The 2022 National American Association for Agricultural Education Conference. Oklahoma City, OK. http://aaae.agedweb.org/downloadfile.asp?ID=5090

Ikendi, S., & Retallick, M. (2023a, April 26-29). *Exported through the theory of change: An inquiry into the compatibility of the U.S. land grant philosophy in Uganda* (Proceedings, pp. 358-361). International Agricultural and Extension Education. Guelph, Canada. https://www.aiaee.org/resources/Documents/2023%20AIAEE%20Conference%20Proceedings%20Final.pdf

Ikendi, S., & Retallick, M. (2023b, May 15-18). *Improving managerial and leadership effectiveness in multistakeholder organizations* (Paper Proceedings, pp. 636-655). The 2023 National American Association for Agricultural Education. Raleigh, NC. https://aaaeonline.org/resources/Documents/National/2023Meeting/23_AAAE_Proceedings_combined_FINAL.pdf

Ikendi, S., Owusu, F., Masinde, D., Bain, C., & Oberhauser, A. (2023a, May 15-18). *Assessment of agronomy extension education on farmers' empowerment towards food production in rural Uganda* (Paper Proceedings, pp. 1016-1036). The 2023 National American Association for Agricultural Education Conference. Raleigh, NC. https://aaaeonline.org/resources/Documents/National/2023Meeting/23_AAAE_Proceedings_combined_FINAL.pdf

Ikendi, S., Retallick, M., Nonnecke, G. (2023b). Implementing global service-learning through school garden. *The Agriculture Education Magazine 95*(6), 25-28. https://www.naae.org/profdevelopment/magazine/archive_issues/Volume95/2023%2005%20--%20May%20June.pdf

Ikendi, S., Owusu, F., & Masinde, D. (2023c, May 15-18). *Community education for behavioral change towards food and nutrition security* (Poster Proceedings, pp. 395-398). The 2023 National American Association for Agricultural Education Conference. Raleigh, NC. https://aaaeonline.org/resources/Documents/National/2023Meeting/2023%20AAAE%20Poster%20Proceedings.pdf

Ikendi, S., Retallick, M., & Nonnecke, G. (2023d, April 26-29). *Influence of school garden learning approach on the academic development of global service-learners* (Conference Proceedings, pp. 362-365). Association for International Agricultural and Extension Education Annual Conference. Guelph, Canada. https://www.aiaee.org/resources/Documents/2023%20AIAEE%20Conference%20Proceedings%20Final.pdf

Ikendi, S., Retallick, M., & Nonnecke, G. (2023e, April 26-29). *Fostering community reciprocal learning through farmer field visits with global service-learners* (Proceedings, pp. 334-337). International Agricultural and Extension Education Conference. Guelph, Canada. https://www.aiaee.org/resources/Documents/2023%20AIAEE%20Conference%20Proceedings%20Final.pdf

Islam, A. H. M. S., von Braun, J., Thorne-Lyman, A. L., & Ahmed, A. U. (2018). Farm diversification and food and nutrition security in Bangladesh: Empirical evidence from nationally representative household panel data. *Food Security*, *10*(3), 701-720. https://doi.org/10.1007/s12571-018-0806-3

Koppmair, S., Kassie, M., & Qaim, M. (2017). Farm production, market access, and dietary diversity in Malawi. *Public Health Nutrition, 20*(2), 325-335. https://doi.org/10.1017/S1368980016002135

Lanou, A. J., Mathews, L. G., Speer, J., Mills, L, & Gold-Leighton, N. (2021). Effects of experiential food education on local food purchasing and eating behavior. *Journal of Agriculture, Food Systems, and Community Development, 10*(4), 211–224. https://doi.org/10.5304/jafscd.2021.104.006

Martin, T. (2018). *Individual capacities (human capital) of the Tusubila crafts group* [Master's Thesis, Iowa State University]. Creative Components. https://lib.dr.iastate.edu/creativecomponents/85

Masinde, D., & McMillan, D. E. (2015). Starting where the people are. In M. L. Butler & D. E. McMillan, (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp. 111-144). Kumarian.

Masinde, D., Butler, M. L., & Mazur, R. (2015a). Getting started. In L. M. Butler & D. E. McMillan, (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp. 57-81). Kumarian.

Masinde, D., McMillan, E. D., Rothschild, M., & Nonnecke, G. (2015b). Leaving door open to emerging needs and opportunities. In L. M. Butler & D. E. McMillan. (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp. 145-164). Kumarian.

Ministry of Agriculture Animal Industry and Fisheries [MAAIF] & Ministry of Health [MoH] (2004). *Uganda food and nutrition strategy and investment plan (UFNSIP): Draft final*. Kampala, Uganda.

Nonnecke, G., McMillan, D. E., Kugonza, D., & Masinde, D. (2015). Leaving the doors open to new beneficiaries. In L. M. Butler & D. E. McMillan, (Eds.), *Tapping philanthropy for development: Lessons learned from a public-private partnership in rural Uganda* (pp 165-189). Kumarian.

Sekabira, H., & Nalunga, S. (2020). Farm production diversity: Is it important for dietary diversity? Panel data evidence from Uganda. *Sustainability*, *12*(3), 1028. https://doi.org/10.3390/su12031028

Sseguya, H., Mazur, R. E., & Flora, C. B. (2018). Social capital dimensions in household food security interventions: Implications for rural Uganda. *Agriculture and Human Values, 35*(1), 117-129. https://doi.org/10.1007/s10460-017-9805-9

Sseguya, H., Mazur, R. E., Wells, B., & Matsiko, F. (2015). Quality of participation in community groups in Kamuli District, Uganda: Implications for policy and practice. *Community Development, 46*(1), 14-25. https://doi.org/10.1080/15575330.2014.971036

Swindale, A., & Bilinsky, P. (2006). *Household dietary diversity score (HDDS) for measurement of household food access: Indicator guide*. Washington, DC:

Uganda Bureau of Statistics [UBOS]. (2016). *The national population and housing census 2014 - Main report.* Kampala: Uganda.

von Grebmer, K., Bernstein, J., Wiemers, M., Schiffer, T., Hanano, A., Towey, O., Chéilleachair, N. R., Foley, C., Gitter, S., Larocque, G., & Fritschel, H. (2022). *2022 global hunger index: Food systems transformation and local governance*. Welthungerhilfe, Bonn and Concern Worldwide, Dublin. https://www.globalhungerindex.org/pdf/en/2022.pdf

Winham, D. M., Masinde, D., Byaruhanga, L., Nonnecke, G., & Rothschild, M. (2016). Improving accessibility and quality of nutrition and health care in Kamuli district, Uganda. *The FASEB Journal*, *30*(Supplement 1), 674.27. https://faseb.onlinelibrary.wiley.com/doi/abs/10.1096/fasebj.30.1_supplement.674.27

Who Teaches and Why? Analyzing Why Individuals Choose to Pursue a Career Teaching Secondary Agricultural Education

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Introduction/Theoretical Framework

Implementing agricultural education in the secondary school setting is becoming increasingly crucial as our society and environment continue to grow and change rapidly. High school students are disconnected from the farm/ranch life, which leads to misconceptions about where the food they eat and the products they use come from. Education is the best solution to this problem by bridging the gap, sharing facts and authentic stories, and creating educated consumers (Radke, 2018). The Department of Economic and Social Affairs stated that by the year 2050, the world population will reach approximately 9.8 billion people, all of whom will have a mouth to feed (Kirby & Olinger, 2019). Agricultural education courses provide hands-on experiences that meet the demands for cross-curricular programming and the needs of students in non-traditional settings (Dailey et al., 2001).

Secondary agricultural education teachers are a significant piece of this puzzle as they will be tasked with educating future generations on how to use their resources efficiently and effectively. Literature has shown there is a critical shortage of not only agricultural education teachers but also educators in core subjects as the student population in public schools continues to grow and the pool of qualified teachers shrinks. Even more alarming is that agricultural education has yet to experience a single year since 1965 in which all teaching positions have been filled (Kantrovich, 2007). This problem is not only prevalent in Texas but is becoming common throughout the entire country. There is roughly a shortage of 200 to 400 agricultural education teachers in the nation per year, which in turn is impacting thousands of students (Lobeck, 2017). This shortage led to the closure of 45 programs, the loss of 88 positions and the prevention of new program openings (Smith, 2020).

The main problems veteran agricultural education teachers face contributing to their decision to leave the profession include lack of administrative support, student discipline and low student motivation (Boone & Boone, 2009). On the other hand, the main problems beginning agricultural teachers encounter that contribute to their exit from the profession include behavior/classroom management, advising the FFA chapter, and curriculum development/lesson planning (Meyers et al., 2005). According to Lawver (2009), there continues to be a struggle to understand what attracts students to the teaching profession in the first place. Richardson and Watt (2006) suggested a different approach be taken for teacher recruitment, induction, and retention in order to make the profession appear more enticing to students who want to become teachers. In order to promote the positive aspects of the profession, agricultural education faculty members within teacher preparation programs must be able to recognize influences on students' decisions to become secondary agricultural education teachers (Lawver, 2009).

Agricultural education is an essential part of our society, yet there is a lack of individuals who choose to teach and educate the public about the subject. So, what drives individuals to pursue a career teaching secondary agricultural education? Peers, parents and agriculture teachers play essential roles in a student's decision to teach agricultural education (Hillison et al., 1987). Lawver and Torres (2011) concluded that students are perhaps being encouraged instead of discouraged to enter the profession by those who play an important and influential role in their lives. Prior teaching and learning experiences and being able to work with adolescents were significant in determining the participants' positive attitudes toward teaching agricultural education (Lawver & Torres, 2011).

The expectancy-value theory, developed by Jacobs and Eccles (1983), was utilized to guide this study. The expectancy-value theory suggests that achievement-related choices are influenced by two main factors: an individual's expectations for success and subjective task value (Leaper, 2011). This theory has been identified as one of the most significant models for determining an individual's academic and career choices (Wigfield & Eccles, 2000). Individuals will choose to perform behaviors with expected outcomes and values they believe in (Borders et al., 2004). This theory postulates that if factors impacting an individual's intention can be identified, it can be predicted whether individuals will perform a specific behavior (Lawver, 2009). According to Eccles et al. (1983), values, ability beliefs and expected success are all factors that contribute to an individual's motivation to make certain academic choices or perform certain behaviors.

Purpose/Objectives

The purpose of this study was to determine why individuals choose to pursue a career teaching secondary agricultural education by analyzing factors that influence an individual's choice to enter the agriculture teaching profession. This study focused on current secondary agricultural education teachers in Texas. The findings from this study could be used to alleviate the agricultural education teacher shortage in Texas by using the identified factors to aid in recruiting for and improving the profession. The following research objective guided this study: Describe participant's decision to become a secondary agricultural education teacher.

Methods/Procedures

The study was administered via an online questionnaire which consisted of a descriptive survey. The survey aimed to gather information about factors influencing individuals to pursue a career teaching secondary agricultural education. The population used in this study consisted of secondary agricultural education teachers in Texas. The sample size table for research activities, developed by Krejcie and Morgan (1970), was utilized to determine how big the sample for the study should be based on the population size. The accessible population of secondary agricultural education teachers in this study was 2,518. This was the number of contacts listed in the online agricultural education teacher directory utilized for this study. Thus, the sample size used for this study was 333 individuals, based on Krejcie and Morgan's (1970) recommendations.

The survey instrument used in this study was adapted and developed from a review of relevant literature and the Ag Ed FIT-Choice scale developed by Lawver (2009). The Ag Ed FIT-Choice scale was adapted from the FIT-Choice® scale developed by Watts and Richardson (2007). The

instrument was split into different sections and asked about demographics, decision to teach, attitude toward teaching, beliefs about teaching and career satisfaction. The questions within the demographic section were multiple choice, while the questions relating to decision, attitude, beliefs and career satisfaction were Likert-type questions.

Dillman's et al. (2008) web survey implementation process was followed during the data collection process, which included using the three-email contact strategy. These three emails included an initial email containing the purpose of the study and the need for their participation, instructions and the survey link. The next two emails were both follow-up emails where individuals who had yet to complete the survey or had not started the survey were asked to do so. Finally, a thank you email was also sent to the participants who had completed the survey. The emails were sent eight days apart, as Dillman et al. (2008) suggested the rapid fire of reminder sequences is generally advised against when distributing online surveys via email, as adequate time should be given between each notice.

Data were analyzed using IBM Statistical Package for Social Science Version 28 (SPSS). There were 333 individuals who received the survey, of which 124 individuals started the survey, but only 116 individuals fully completed it, which resulted in a response rate of 34.83%. Frequencies and percentages were calculated for all Likert scale items. Due to the low response rate, we used a comparison of early to late responders as suggested in Linder, Murphy & Briers (2001). Respondents were considered early if they responded within the first two weeks of the survey being open. Respondents were considered late if they responded within the last two weeks of the survey. There were no statistically significant differences between early and late responders.

Findings/Results

The data describes the level of agreement participants had with factors influencing their decision to teach agricultural education. Participants were asked to rate their level of agreement or disagreement with statements related to their decision to become an agricultural education teacher. A five-point Likert-type scale was utilized for participants to rate their level of agreement/disagreement, which included the following options: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neither agree nor disagree*, 4 = *agree*, and 5 = *strongly agree*.

Table 1
Decision to Teach Secondary Agricultural Education (*n* = 121)

	Strongly Agree		Agree		Neither Agree nor Disagree		Disagree		Strongly Disagree	
Statement…	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Work hours influenced my decision	6	4.8	12	9.7	37	29.8	48	38.7	18	14.5
My student teaching influenced my decision	32	25.8	42	33.9	33	26.6	10	8.1	4	3.2

My cooperating teacher influenced my decision	30	24.2	38	30.6	37	29.8	10	8.1	6	4.8
Level of knowledge influenced my decision	49	39.5	45	36.3	16	12.9	9	7.3	2	1.6
Personal experiences influenced my decision	72	58.1	42	33.9	1	0.8	5	4.0	1	0.8
Income had an influence on my decision	3	2.4	12	9.7	37	29.8	45	36.3	24	19.4
Job security influenced my decision	10	8.1	60	48.4	26	21.0	13	10.5	12	9.7
My personal qualities influenced my decision	36	29.0	69	55.6	10	8.1	4	3.2	2	1.6
My teaching abilities influenced my decision	21	16.9	61	49.2	26	21.0	8	6.5	5	4.0
Others told me teaching was not a good career	9	7.3	39	31.5	30	24.2	33	26.6	10	8.1

Conclusions/Recommendations

Fives et al. (2007) suggested the number of hours a student teacher works has a high impact on their decision to become a teacher. The findings from this study challenge these suggestions and bring forth the recommendation that student teachers and young teachers in their first years of teaching should be involved in and do as much as they possibly can, regardless of the number of hours that would be demanded. From this data, it can be concluded that the student teaching experience plays an important role in the decision to teach. Agricultural education teacher preparation programs must continue to place their students in high-quality high-school programs in order for positive experiences to happen. In addition to student teaching, it was apparent that cooperating teachers can have an influence on their student teacher's choice to teach. Cooperating teachers must understand and realize the influence/ impact, whether it be positive or negative, they can have on their student teacher's decision to become a teacher. This supports Kasperbauer and Roberts (2007) who concluded the student-teachers relationship with their cooperating teacher is essential to positive field experiences.

In regard to the participant's level of knowledge having an influence on their decision to teach, a few questions could be asked. Is the participant's level of knowledge asserting a positive or negative influence on their decision to teach? Are students receiving appropriate and correct knowledge from their high school ag teachers and instructors at the college level in order to be successful? If not, what are students failing to learn that is crucial to their preparedness and readiness for their beginning years as secondary agricultural education teachers? Personal

experiences were also an area that many of the participants felt as though influenced their decision to teach. The researcher recommends that further analysis be conducted on the participant's personal experiences, what those experiences entail, and how they influenced their decision to teach.

Perhaps one of the most interesting results was in relation to income. More than half of the participants either disagreed or strongly disagreed with the statement that income influenced their decision to teach. It is no secret that, in general, teachers across all subjects do not earn a high income compared to other professions. According to McIntosh et al. (2018), low income was identified as a primary reason teachers leave the profession. On the other hand, making a higher income was identified as a reason that would influence individuals to consider becoming teachers (Broughman & Rollefson, 1999). Given the current agricultural education teacher shortage in many states, agricultural education teacher pay is trending higher. This makes income less of a deterrent to entering the agricultural education profession than it was in previous decades.

Job security was identified as a major factor influencing the participant's decision to teach. Agricultural education teacher preparation programs need to make it a point to discuss and use this as a selling point when recruiting potential students into their programs and the profession. Many of the participants noted their personal qualities influenced their decision to teach. What specific personal qualities influence an individual's decision to teach? How are these qualities being developed? Teaching abilities were another item the participants felt strongly about. Are students who go through teacher preparation programs receiving the correct training, support and advice from their instructors to develop quality teaching abilities? More so, do individuals who go through student teaching feel as though they are given opportunities to advance and implement their abilities?

A large number of participants either agreed or strongly agreed they had been encouraged to pursue careers other than being secondary agricultural education teachers. This data brings forth the following questions that should be considered for further analysis. Why are individuals who want to pursue a job teaching secondary agricultural education still being discouraged from doing so? Who are these individuals being discouraged by? How do these individuals discouraging others from teaching perceive the job/agricultural education profession?

The first recommendation is for agricultural education teacher preparation programs to look into different ways they can better recruit students into the programs and advocate for the job. How could the findings of this study regarding the participant's decision to teach be highlighted to help in this recruitment process of younger generations? A second recommendation is to analyze the public's perception of being a secondary agricultural education teacher. This recommendation is suggested due to the finding that individuals are still being encouraged to pursue careers other than teaching agricultural education. The student teaching experience and the relationship between cooperating teacher and student teacher are two areas that require further inquiry. Using experimental design to analyze student teaching experiences along with the relationship between the student teacher and cooperating teacher may offer deeper insight into these critical factors. Qualitative methods could also be used to explore the human side of these relationships and gain understanding that cannot be gleaned from mere descriptive analysis.

References

Boone, H., & Boone, D. (2009). An assessment of problems faced by high school agricultural education teachers. *Journal of Agricultural Education*, *48*(2), 36-45 https://doi.org/10.5032/jae.2007.02036

Borders, A., Earleywine, M., & Huey, S. J. (2004). Predicting problem behaviors with multiple expectancies: Expanding expectancy-value theory. *Adolescence, 39*(155), 539-550.

Broughman, S. P., & Rollefson. (1999). Teacher supply in the United States: Sources of newly hired teachers in public and private schools: 1987-88 to 1993-94. *Education Statistics Quarterly, 2*(3), 28-32. https://nces.ed.gov/pubs2000/2000309.pdf

Dailey, A. L., Conroy, C. A., & Shelley-Tolbert, C. A. (2001). Using agricultural education as the context to teach life skills. *Journal of Agricultural Education*, *42*(1), 11-20. https://doi.org/10.5032/jae.2001.01011

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2008). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method* (3rd ed.). John Wiley.

Eccles, J., Adler, T., Futterman, R., Goff, S., Kaczala, C., Meece, J. L, & Midgley, C. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motivation,* 75-146. Freeman.

Fives, H., Hamman, D., & Oliverez, A. (2007). Does burnout begin with student teaching? Analyzing efficacy, burnout, and support during the student-teaching Semester. *Teaching and Teacher Education*, *23*(6), 916-934. https://doi:10.1016/j.tate.2006.03.013

Hillison, J., Camp, W. G. & Burke, S. R. (1987). Why undergraduates choose agricultural education as a major: 1980 vs. 1985. *Journal of Agricultural Education*, *28*(2), 101-124. https://doi.org/10.5032/jaataea.1987.02002

Kantrovich, A, J. (2007). A national study of the supply and demand for teachers of agricultural education from 2004-2006. Morehead, KY: Morehead State University. https://www.naae.org/teachag/2007%20Supply%20Demand%20Study%20.pdf

Kasperbauer, H. J., & Roberts, T. G. (2007). Influence of the relationship between the student teacher and cooperating teacher on student teacher's decision to enter teaching. *Journal of Agricultural Education, 48*(1), 8-19. https://doi.org/10.5032/jae.2007/01008

Kirby, T., Olinger, G. (2019). *Community Agriculture Alliance: The importance of agricultural education*. Steamboat Pilot & Today https://www.steamboatpilot.com/news/community-agriculture-alliance-the-importance-of-agricultural-education/

Krejcie, R. V., & Morgan, D. W., (1970). Determining sample size for research activities. *Educational and Psychological Measurement, 30*(3), 607-610. https://doi.org/10.1177/001316447003000308

Lawver, R, G. (2009). *Factors influencing agricultural education students' choice to teach.* (Publication No. 3455498) [Doctoral Dissertation, University of Missouri-Columbia]. ProQuest Dissertations and Theses Global.

Lawver, R. G., & Torres, R. M. (2011). Determinants of pre-service students' choice to teach secondary agricultural education. *Journal of Agricultural Education, 52*(1), 61-71. https://doi.org/10.5032/jae.2011.01061

Leaper, C. (2011). Chapter 9 - More similarities than differences in contemporary theories of social development? A plea for theory bridging. *Advances in Child Development and Behavior, 40,* 337-378. https://doi.org/10.1016/B978-0-12-386491-8.00009-8

Lindner, J., Murphy, T., & Briers, G. (2001). Handling Nonresponse error in Social Science Research. *Journal of Agricultural Education, 42*(4), 43-53. https://doi.org/10.5032/jae.2001.04043

Lobeck, J. (2017). The shortage of agricultural teachers raising concerns, but the message is reaching a wide audience. https://agriculture.az.gov/news/shortage-agriculture-teachers-raising-concerns-message-reaching-wide-audience

Jacobs, J. E. & Eccles, J. S. (2000). Parents, task values, and real-life achievement-related choices. *Intrinsic and extrinsic motivation: The search for optimal motivation and performance,* 405–439. https://doi.org/10.1016/B978-012619070-0/50036-2

McIntosh, B., Morrish, D., & Wakefield, D. (2018). Secondary agricultural science teachers: Factors affecting who will stay and who will go. *North American Colleges and Teachers of Agriculture, 62*(3), 249-253. https://www.jstor.org/stable/26769561

Meyers, B. E., Deyer, J. E., & Washburn, S. G. (2005). Problems facing beginning agricultural teachers. *Journal of Agricultural Education, 46*(3), 47-55. https://doi.org/10.5032/jae.2005.03047

National Association of Agricultural Educators. (2022). What is agricultural education? NAAE. https://www.naae.org/whatisaged/

Radke, A. (2018). *Ag education desperately needed in schools*. Beef Magazine. https://www.beefmagazine.com/outlook/ag-education-desperately-needed-schools

Richardson, P. W. & Watt, H. M. G. (2006). Who chooses teaching and why? Profiling characteristics and motivations across three Australian universities. *Asia-Pacific Journal of Teacher Education, 34*(1), 27-56. https://doi.org/10.1080/13598660500480290

Smith, M. (2020). *A career worth celebrating today and every day*. Fillmore County Journal. https://fillmorecountyjournal.com/a-career-worth-celebrating-today-and-every-day/

Watt, H. M. G., & Richardson, P. W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT-Choice Scale. *Journal of Experimental Education, 75*(3), 167-202. https://doi.org/10.3200/JEXE.75.3.167- 202

An Analysis of Time Allocation of Student Teachers in Each Circle of the Three-Circle Model of Agricultural Education

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Introduction/Theoretical Framework

Even though agricultural education classrooms across the United States are currently feeling the pain of leaving agriculture teacher positions unfilled, this problem is not one unique to the post-covid era (Smith, et al., 2017). According to Hillson (1987), this has been an area of concern since the passing of the Smith-Hughes Act in 1917. Many studies have explored the factors that lead to the recruitment and retention of agricultural science teachers and have found that both external and internal motivations draw and keep these educators in the classroom (Borman & Dowling, 2008; Cano & Miller, 1992; Crutchfield, et al., 2013). These motivations include job satisfaction and efficacy. A strong link between time spent perfecting the craft of teaching and coaching and these factors have been identified (Rocca & Washburn, 2006).

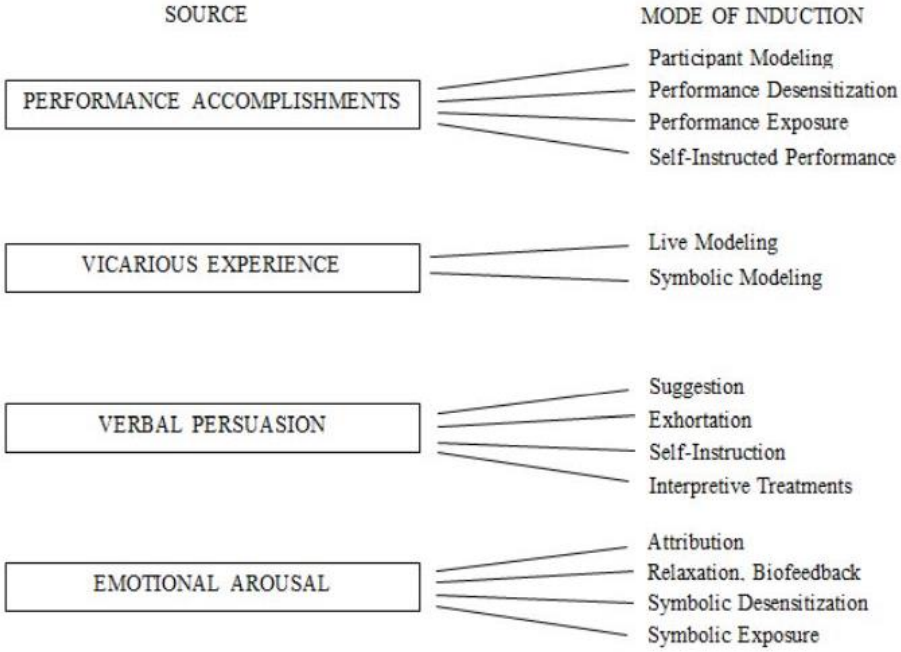
Teacher preparation within agricultural education is the initial pillar to success for developing efficacy and competence both in and out of the classroom. Typically, this is achieved through a capstone experience also known as their student teaching practicum and is a crucial to their growth as a teacher and develop their teaching identity (Edwards & Briers, 2001). Often this experience includes a variety of opportunities for preservice teachers to observe and lead students through learning experientially (Miller & Wilson, 2010). Within agricultural education, teacher must be able to facilitate student experiences in the three circles of the agricultural education model: classroom, FFA and SAE as well-balanced programs allow students opportunities in all three experiences. Classroom instruction, also known as contextual learning, allows students to gain knowledge and experiences in agricultural concepts (Agricultural Education, 2019). FFA, or the student leadership component, allows students to grow in the areas of premier leadership, personal growth, and career success through participation in a variety of activities. Finally, SAE, or supervised agricultural experiences, give students the opportunity to apply what they have learned in the classroom to an experiential, work-based or service-oriented project. Studies have explored the use of time within the student teaching experience but have not evaluated the balance of time spent in each of the three circles (Coleman, et al., 2021). Evaluating this balance would allow teacher education programs to determine the effectiveness of student teaching in the preparation of their future agricultural educators. Ideally, this would allow universities to determine areas for reinforcement and refinement and improve this capstone experience.

This study is guided by Bandera's (1997) Model Sources of Efficacy Information. Bandera asserted that people tend to succeed if they are confident in their own abilities. Confidence is created through experience and leads to improved performance (Bandera, 1994). Bandera (1977) identified four sources of efficacy: performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal, as outlined in Figure 1. This study concentrates on the *performance accomplishments* and *vicarious experiences* sources outlined in this model. Performance accomplishments are formed during experiences and can lead to the

raising or lowering of self-confidence in one's ability to perform a task. Positive experiences lead to higher efficacy and negative experiences lead to lower expectations of success. Vicarious experiences which are inducted through live modeling and symbolic modeling allows for expectations to be gain through a person's previous experiences and through the experiences of others.

Figure 1

Bandera's (1997) Model of Sources of Efficacy Information



Purpose(s)/Objectives(s)

The purpose of this study was to determine the amount of time student teachers from Texas Tech University spent during their 17-week student teaching experience in each of the three circles of the agricultural education model: classroom, FFA and SAE. This study was guided by the following research objectives:

1. Determine the activities student teachers are spending time engaging in during their student teaching experience.
2. Examine the balance of time spent in each of the three circles of agricultural education: classroom, FFA and SAE.

Methods/Procedures

This longitudinal census study involved the agricultural education preservice teachers (N=29) enrolled in their student teaching placement at Texas Tech University during the 2021 and 2022 spring semesters. Eighty-three percent of participants were Caucasian, and seventeen percent were Hispanic. A majority of the student teachers were female (79%). As student teachers completed their 17-week placement, they were asked to log their time daily by activity.

Data was self-reported by student teachers using a Microsoft excel sheet to track their time spent. Classroom related activities included observing their cooperating teacher, conference time with cooperating teacher, instruction preparation, lesson delivery, laboratory preparation/maintenance, scoring student work, administrative duties, professional development, and adult education. Preservice teachers also tracked their hours spent supervising SAE projects and engaging in FFA activities including local, district, area or state events and preparing for CDEs/competitions.

Time was complied into spreadsheets and the time spent in each activity was totaled. Activities were categorized by the area of the three circle model they fall into and each circle was summed. Total hours spent in all three circles was computed and percentages of per circle were calculated.

Results/Findings

Table 1
Time Spent by Preservice Teachers in Classroom, FFA and SAE Activities

Activity	Category	Time Logged	%
Observing Cooperating Teacher	Classroom	2126	8.54
Conference Time with Cooperating Teacher	Classroom	828	3.32
Instruction Preparation	Classroom	3110	12.49
Classroom Instruction	Classroom	7047	28.29
Laboratory Preparation/Maintenance	Classroom	382	1.53
Scoring Student Work	Classroom	940	3.77
Administrative Duties	Classroom	87	0.35
Professional Development	Classroom	633	2.54
Adult Education	Classroom	486	1.95
Local FFA Activities	FFA	616	2.47
District, Area and/or State FFA Activities	FFA	1487	5.97
CDE/Contest Preparation	FFA	2927	11.75
SAE Supervision	SAE	4239	17.02
Total (N=29)		24908	100.00

Preservice teachers spent the most time in classroom instruction (Σ=7047, 28.29%), SAE supervision (Σ=4239, 17.02%), and instruction preparation (Σ= 3110, 12.49%). They spent the least amount of time completing administrative duties (Σ= 87, 0.35%), laboratory preparation/maintenance (Σ= 382, 1.53%), and adult education (Σ= 486, 1.95%).

Table 2
Time Spent by Preservice Teachers in the Three Circles of the Agricultural Education Model

Category	Time Spent	%
Classroom	15639	62.79
FFA	5030	20.19
SAE	4239	17.02
Total (N=29)	24908	100.00%

When evaluating the data from the perspective of the three-circle model of agricultural education, the most time was spent immersing in classroom activities (Σ= 15639, 62.79%). Student teachers spent similar amounts of time in activities pertaining to the FFA (Σ=5030, 20.19%) and SAE (Σ=4239, 17.02%) circles of the model. Overall, student teachers spent 24,908 hours engaging in activities in all three circles over the course of their 17-week experience.

Conclusions/ Discussion/ Implications

The results of this study have three major implications. First, the amount of time student teachers are engaging in the classroom circle is important to their preparation for a career in agricultural education. Often, student teachers come with a plethora of experiences in SAE and FFA but lack efficacy and competence in the classroom due to previous experience (Miller & Wilson, 2010). Student teachers in this study spent more time instructing courses than any other activity. They also spent the most time completing classroom related activities when compared to their time spent in FFA and SAE activities. This is encouraging as it will hopefully help to perfect their craft and increase their job satisfaction as Rocca & Washburn (2006) stressed was a key factor in teacher retention. Bandera's theory (1977) found that efficacy can be attained through performance accomplishments. The extended time student teachers are spending on instruction allowed them more opportunities for success and hopefully, in turn, increased their efficacy related to the delivery of instruction.

The second major implication found in this study is that more time should be spent in conference with their cooperating teachers. Conferencing with the cooperating teacher represents the opportunity for feedback on instruction and facilitation of activities. This study found that only 3.32% of their student teaching experience consisted of this feedback time. Student teaching should be a time for growth and development of new skills. Miller and Wilson (2010) expressed the importance of the cooperating teacher guiding and evaluating the student teacher throughout the entire experience to provide constructive feedback and reinforce necessary skills for success. The lack of feedback time provided could be stunting the growth of these future educators. As Bandera (1977) states in the Model Sources of Efficacy Information Theory, vicarious experiences are one mode of gaining efficacy. Vicarious experiences allow the educator to connect their successes and failures to the experiences of another and allow them to gain expectations for success moving forward. This mode of gaining efficacy requires consultation of others and can be directly achieved through conferencing with their cooperating teacher.

The third and final implication of this study is the need for initially creating opportunities for engagement in uncommon activities that may not be typically included in preservice teacher development but are crucial to their success in their own classroom. Many student teachers participating in this study had little to no time engaged in administrative duties or adult education. Coleman, et al. (2021) also found the need for complete immersion in all aspects of the agricultural educator roles to be crucial to their development and future career success. If student teachers are not given the opportunity to succeed in these areas, it could lead to a lack of self-confidence as they enter their career (Bandera, 1977).

Based on the results of this study, universities need to be intentional in ensuring that student teachers can participate in activities that reflect all three circles of the agricultural

education model. Even though as a whole the participants of this study did gain experience in all three circles, some participants spent very little time in a few specific activities such as supervising SAE projects, taking on an administrative role and learning through professional development. Host schools and cooperating teachers need to be made aware of specific expectations by university supervisors so that student teachers receive a holistic experience. Clearer expectations would ensure that regardless of host school, all student teachers would get engagement in all three circles and set them up for success as they approach running their own program in the future. Universities should also monitor time spent on a weekly basis to find deficits during the student teaching experience and contact sites to ensure opportunities for engagement can be incorporated in the future. This approach could also help encourage an increase in conferencing between the student teacher and the cooperating teacher to increase the feedback and vicarious experiences provided.

Further research should explore if the time spent in each of the three circles of the agricultural education model is reflective of the schedule of an agricultural educator. If student teaching is to prepare these students to run their own program and classroom, the more accurate this experience is to the day to day of an agriculture teacher, the more influential it can be in their preparation. Additionally, research should evaluate if student teaching increases efficacy and competence in activities related to the three-circle model. A longitudinal study that assesses the pre- and post- levels for activities in each circle would allow for emphasis to be placed on necessary activities and for time allocation to be shifted appropriately.

References

Agricultural Education. National FFA Organization. (2019, January 14). Retrieved April 30, 2023, from https://www.ffa.org/agricultural-education/

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84(2), 191–215. https://doi.org/10.1037/0033-295x84.2.191

Bandura, A. (1994). Self-efficacy. In V.S. Ramachaudran (Ed.), Encyclopedia of human behavior (Vol. 4, pp. 71–81). Academic Press.

Borman, G. D., & Dowling, N. M. (2008). Teacher Attrition and Retention: A Meta-Analytic and Narrative Review of the Research. Review of Educational Research, 78(3), 367-409. doi:310.3102/0034654308321455

Cano, J., & Miller, G. (1992). A gender analysis of job satisfaction, job satisfier factors, and job dissatisfier factors of agriculture education teachers. Journal of Agricultural Education, 33(3), 40-46. doi:10.5032/jae.1992.03040

Coleman, B., Ferand, N., Bunch, J. C., & Israel, G. (2021). Examining preservice teachers' performance during a 14-week student teaching experience: A longitudinal study. Journal of Agricultural Education, 62(3), 258-274.https://doi.org/10.5032/jae.2021.03258

Crutchfield, N., Ritz, R., & Burris, S. (2013). Why agricultural educators remain in the classroom. Journal of Agricultural Education, 54(2), 1-14. doi: 10.5032/jae.2013.02001

Edwards, M. C., & Briers, G. E. (2001). Cooperating teachers' perceptions of important elements of the student teaching experience: A focus group approach with quantitative follow-up. Journal of Agricultural Education, 42(3), 30–41. doi:10.5032/jae.2001.03030

Hillison, J. (1987). Agricultural teacher education preceding the Smith-Hughes act. Journal of the American Association of Teacher Educators in Agriculture, 28(2), 8-17. doi:10.5032/jaatea.1987.02008

Miller, G., & Wilson, E. B. (2010). Designing field-based and experiential education for preservice teachers in agriculture. In R. M. Torres, T. Kitchell, & A. L. Ball (Eds.), Preparing and advancing teachers in agricultural education (pp. 131–141). Curriculum Material Service, The Ohio State University

Rocca, S. J., & Washburn, S. G. (2006). Comparison of teacher efficacy among traditionally and alternatively certified agriculture teachers. Journal of Agricultural Education, 47(3), 58-69. doi:10.5032/jae.2006.03058

Smith, A. R., Lawver, R. G., & Foster, D. D. (2017). National Agricultural Education Supply and Demand Study, 2016 Executive Summary. Retrieved from:http://aaaeonline.org/Resources/Documents/NSD 2016Summary.pdf

Smith, A. R., Foster, D. D., & Lawver, R. G. (2022). National Agricultural Education Supply and Demand Study, 2021 Executive Summary. Retrieved from:http://aaaeonline.org/Resources/Documents/NSD 2021Summary.pdf

Exploring Alternatively Certified Agriculture Teachers' Choice to Teach

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Introduction/Theoretical Framework

According to Donitsa-Schmidt and Zuzovsky (2014), education is facing many problems including funding, recruitment, low salaries, retirement, and retention. Due to shortage concerns, schools are forced to either leave positions open, close programs or hire individuals who are not certified (Roberts & Dyer, 2004). Data from 2019 found that 70 agricultural education positions were lost, and 36 programs closed across the United States (Foster et al., 2020). One option that is currently available to assist the supply issue is alternative certification. Alternative certification routes not only have the ability to provide a solution to increase the teacher supply, but also can attract a wide variety of individuals with diverse backgrounds into the teaching field (Woods, 2016). Previous research studies have sought to determine the career motivations of senior agricultural education students' intent to teach but have not focused on alternative certification (Lawver & Torres, 2012). Identifying these motivational factors for this population can help with recruitment strategies to engage highly qualified individuals who possess practical agricultural content knowledge that is of value in the classroom (Ruhland & Bremer, 2002).

The expectancy-value theory explains motivation based on three constructs: expectancy or ability beliefs, task value (attainment, intrinsic, utility, and cost), and the perceived difficulty of the task along with the amount of effort needed to complete the task (Watt & Richardson, 2007). Jacobs and Eccles (2000) highlighted the relationship between beliefs, expectations for success, and values for the task as having an influence on both achievement and choice. Eccles et al. (1999) study has shown that the expectancy-value theory's constructs of expectancies and values can predict an individual's career choices.

Purpose/Objective

The purpose of the research study was to explore the factors that influence alternatively certified teachers' choice to teach.

1. Describe alternatively certified Texas agriculture teachers' motivational factors that influenced their decision to teach agricultural education.
2. Describe alternatively certified Texas agriculture teachers' beliefs about teaching agricultural education.
3. Describe alternatively certified Texas agriculture teachers' decision to become a teacher.

Methods/Procedures

The descriptive research study's target population included agriculture teachers in Texas who used an alternatively certified pathway to obtain their teaching certificate. However, there is no tracking system in place to identify these individuals. Through extensive efforts to identify this population, a frame of 139 was developed by the researcher to collect data and comprised the accessible population. The responded sample consisted of 45, yielding a response rate of

32%. One respondent failed to provide answers to a large portion of questions, so the final sample size was 44 (n = 44).

Data were collected using the Ag Ed FIT-Choice Instrument (Lawver, 2009). Qualtrics was used for online distribution. A panel of experts reviewed the instrument for face and content validity. The Ag Ed FIT-Choice Instrument's reliability reported a Cronbach's alpha of .91 (Lawver, 2009). Descriptive statistics were analyzed using SPSS.

Results/Findings

The first objective sought to describe influential motivational factors. The study found the participants tended to agree (M = 3.72; SD = .38) with the statements. The statistics are provided in Table 1. The sub-construct, time for family (M = 2.39; SD = .77), exhibited a mean score less than mid-point which indicated the participants' disagreement with the statements, and was the least rated motivational factor. The fallback career sub-construct's (M = 3.06; SD = .99) mean score indicated that the participants did not agree or disagree with teaching being a fallback career. The remaining sub-constructs were rated as positive motivational factors. Those included ability (M = 4.30; SD = .48), intrinsic career value (M = 3.95; SD = .63), job security (M = 3.87; SD = .89), job transferability (M = 3.19; SD = .78), shape the future of adolescents (M = 4.48; SD = .57), enhance social equity (M = 4.01; SD = .72), make a social contribution (M = 4.34; SD = .69), work with adolescents (M = 3.91; SD = .84), prior teaching and learning experiences (M = 4.33; SD = .70), and social influences (M = 3.61; SD = 1.05).

Table 1

Motivation Construct (n = 44)

Motivation	*M*	*SD*	Number of items
Shape the future of adolescents	4.48	.57	3
Make a social contribution	4.34	.69	3
Prior teaching and learning experiences	4.33	.70	3
Ability	4.30	.48	3
Enhance social equity	4.01	.72	3
Intrinsic career value	3.95	.63	4
Work with adolescents	3.91	.84	4
Job security	3.87	.89	3
Social influences	3.61	1.05	3
Job transferability	3.19	.78	3
Fallback career	3.06	.99	3
Time for family	2.39	.77	5
Construct average	**3.72**	**.38**	**40**

Objective two sought to describe the alternatively certified agriculture teachers' initial beliefs about teaching agricultural education. The participants were asked statements that included information about the specialized knowledge needed to be an agriculture teacher, workload, salary, professional status, and morale. The findings suggested the alternatively certified agriculture teachers agreed (M = 3.68; SD = .42) with each of the statements concerning their beliefs about teaching.

The descriptive statistics for the five sub-constructs of the beliefs about teaching construct can be found in Table 2. The participants did not agree with the statements concerning the salary sub-construct (M = 2.47; SD = .97). These statements discussed ideas regarding agriculture teaching being a profitable career. The social status (M = 3.14; SD = .95) and teacher morale (M = 3.17; SD = .81) sub-constructs mean score near the center of the scale indicated the participants did not agree or disagree with each of the statements. The study's findings showed the participants agreed that teaching is an expert career (M = 4.31; SD = .55) requiring specific knowledge and agreed with the high demand sub-construct (M = 4.70; SD = .39) items. The participants identified teaching agriculture as a challenging career.

Table 2

Beliefs about Teaching Construct (n = 44)

Beliefs	*M*	*SD*	Number of items
High demand	4.70	.39	3
Expert career	4.31	.55	4
Teacher morale	3.17	.81	3
Social status	3.14	.95	3
Salary	2.47	.97	2
Construct average	**3.68**	**.42**	**15**

Objective three sought to describe alternatively certified agriculture teachers' decision to become a teacher. Items assessed included topics about the encouragement or deterrence to become an agriculture teacher and their satisfaction with their decision to become an agriculture teacher. From the data we found that participants tended to agree (M = 3.84; SD = .63) with the statements concerning their decision to teach. Additionally, two sub-constructs were evaluated in the decision to teach construct (Table 3). The relatively higher mean scores associated with the sub-construct satisfaction with choice (M = 4.01; SD = .79) indicated the participants were relatively satisfied with their decision to come an agriculture teacher. The social dissuasion sub-construct (M = 3.67; SD = .81) indicated the participants experienced interactions that guided them away from a teaching career.

Table 3

Decision to Teach Construct (*n* = 44)

Decision	*M*	*SD*	Number of items
Satisfaction with choice	4.01	.79	3
Social dissuasion	3.67	.81	3
Construct average	**3.84**	**.63**	**6**

Conclusions/Recommendations/Implications

The social utility value factors including the ability to shape the future of adolescents, ability to make a social contribution, and enhance social equity were identified to be important motivators for choosing to become a teacher. In addition, prior teaching and learning experiences and perceived teaching ability beliefs were identified to be highly rated motivational factors. Similar sub-constructs were identified as motivational factors for preservice undergraduate and graduate students (Richardson & Watt, 2006) as well as agriculture preservice students (Ingram et al., 2018; Lawver & Torres, 2011). Support and encouragement from others were minimally important in the participants motivation to teach. Many of the same motivational factors for choosing teaching were mirrored in preservice teachers and the alternatively certified Texas agriculture teachers indicating both groups of individuals are attracted to teaching for similar reasons.

The motivational factor sub-constructs are an important part to the expectancy-value theory. The decision to complete a task is dependent on an individual's self-perceived abilities, task value, and the cost associated with it (Eccles & Wigfield, 2002). The alternatively certified agriculture teachers were motivated to teach because they believed they had the ability to teach, had interest in the career itself, and had the ability to positively impact society.

Based on the data, teaching agriculture was believed to be an emotionally and physically demanding career which required unique specialized and technical knowledge. In addition, it was a low paying occupation. In other words, the participants believed that teaching is a career that has high task demands and low task returns. These findings were supported by previous studies regarding preservice teachers (Richardson & Watt, 2006; Richardson et al., 2007; Watt & Richardson, 2007).

The beliefs about teaching section of the Ag Ed FIT-Choice Instrument assessed the cost aspect of the expectancy value theory. The high demand and expert career sub-constructs were grouped into the task demand higher order factor while teacher morale, social status, and salary represented the task return higher order factor. Ultimately, the participants believed that a career teaching agriculture had increased costs versus returns. That leads one to question why agriculture teachers continue to remain in the career field. To answer the question according to the expectancy-value theory, other rewards or task returns not assessed by the instrument may be present to offset the costs.

Overall, the alternatively certified agriculture teachers were satisfied with their decision to teach despite their beliefs about teaching being a high demand and low return career. The alternatively certified teachers' findings support other previous research studies conclusions for preservice teachers (Richardson & Watt, 2006; Richardson et al., 2007; Watt & Richardson, 2007).

However, the expectancy-value theory indicated that in order for an individual to decide to complete a task, they must believe they have the ability to complete it, value the outcome, and assess the cost associated with it (Eccles & Wigfield, 2002). Alternatively certified Texas agriculture teachers believed they had the ability to teach, prized the social and intrinsic values with teaching, and acknowledged the cost for becoming an agriculture teacher. Since they exhibited satisfaction with their choice to teach, the cost aspect of the job might not be an influential factor. Since the findings indicated teaching agriculture involved a high cost, why did the participants decide to teach? Quite possibly other rewards are associated with teaching agricultural education that were not assessed by the Ag Ed FIT-Choice Instrument. Agricultural education is a unique content area that is unlike any other general teaching position. Although negative aspects were identified, the positive experiences must have ultimately outweighed them.

Motivational factors should be utilized for recruitment tools for individuals who might be considering a teaching career. Specific information concerning the ability to shape the future of adolescents, the capacity to make a social contribution, and enhance social equity are more likely to impact an individual's decision to teach. The findings of this study illuminated the fact that there are multiple influential factors that impact an individual's decision to teach. It is important to not solely focus on one or two values to promote the agriculture teaching field. Instead, emphasize multiple influential factors that are likely to produce professional satisfaction.

A recommendation for future research would be to conduct qualitative interviews and focus groups with alternatively certified teachers to gain a deeper understanding of the individuals who choose this route into teaching. Interviews might have the ability to uncover the additional rewards which were not discovered by using the Ag Ed FIT-Choice Instrument.

References

Donitsa-Schmidt, S., & Zuzovsky, R. (2014). Teacher supply and demand: The school level perspective. *American Journal of Educational Research, 2*(6), 420-429. https://doi.org/10.12691/education-2-6-14

Eccles, J. S., Barber, B. L., & Jozefowicz, D. (1999). Linking gender to educational, occupational, and recreational choices: Applying the Eccles et al. model of achievement-related choices. In W. B. Swann, Jr., J. H. Langlois, & L. A. Gilbert (Eds.), *Sexism and stereotypes in modern society: The gender science of Janet Taylor Spence* (pp. 153-192). American Psychological Association.

Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology, 53*(1), 109-32. https://doi.org/10.1146/annurev.psych.53.100901.135153

Foster, D. D., Lawver, R. G., & Smith, A. R., (2020). *National agricultural education supply and demand study, 2019 executive summary*. AAAE. http://aaaeonline.org/Resources/Documents/NS D2019Summary.pdf

Ingram, M. L., Sorensen, T. J., Warnick, B. K., & Lawver, R. G. (2018). The influence of school-based agricultural education on preservice agriculture teachers' choice to teach. *Journal of Agricultural Education, 59*(2), 64-78. https://doi.org/10.5032/jae.2018.02064

Jacobs, J. E., & Eccles, J. S. (2000). Parents, task values, and real-life achievement-related choices. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance* (pp. 405-439). Academic Press.

Lawver, R. G. (2009). *Factors influencing agricultural education students' choice to teach* (Publication No. 3455498) [Doctoral dissertation, University of Missouri-Columbia]. ProQuest Dissertations and Theses Global.

Lawver, R. G., & Torres, R. M. (2011). Determinants of pre-service students' choice to teach secondary agricultural education. *Journal of Agricultural Education, 52*(1), 61-71. https://doi.org/10.5032/jae.2011.01061

Lawver, R. G., & Torres, R. M. (2012). An analysis of post-secondary agricultural education students' choice to teach. *Journal of Agricultural Education, 53*(2), 28-42. https://doi.org/10.5032/jae.2012.02028

Richardson, P. W., & Watt, H. M. G. (2006). Who chooses teaching and why? Profiling characteristics and motivations across three Australian universities. *Asia-Pacific Journal of Teacher Education, 34*(1), 27-56. https://www.doi.org/10.1080/13598660500480290

Richardson, P. W., Watt, H. M. G., Tysvaer, N. M. (2007). What motivates people from business-related careers to change to teaching? In M. F. Ozbilgin & A. Malach-Pines (Eds.), *Career choice in management and entrepreneurship – A research companion* (pp. 219-239). Edward Elgar Press.

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

Ruhland, S. K., & Bremer, C. D. (2002). Professional development needs of novice career and technical education teachers. *Journal of Career and Technical Education, 19*(1), 18-31. https://doi.org/10.21061/jcte.v19i1.656

Watt, H. M. G., & Richardson, P. W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT-Choice Scale. *Journal of Experimental Education, 75*(3), 167-202. https://doi.org/10.3200/JEXE.75.3.167-202

Woods, J. R. (2016). *Mitigating teacher shortages: Alternative teacher certification* (Teacher Shortages: What We Know Series 1). Education Commission of the States. https://www.ecs.org/wp-content/uploads/Mitigating-Teacher-Shortages-Alternative-Certification.pdf

The Needs of Oklahoma School-Based Agricultural Education Teachers Related to Teaching Agriculture, Food and Natural Resources Topics

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Introduction, Purpose, and Objectives

One of the most critical factors to developing and improving agricultural educators is to correctly identify their highest in-demand needs (Layfield & Dobbins, 2002). Research in agricultural education has identified various teacher's training needs as it pertains to classroom management and instruction (Albritton & Roberts, 2020; DiBenedetto et al., 2018; Layfield & Dobbins, 2002; Smalley et al., 2019). As such, "agricultural educators are required to have both subject specific and technical knowledge requiring an appropriate amount of knowledge and skill to be considered an expert while constantly adapting to new technologies and practices in the field" (Albritton & Roberts, 2020, p. 140). Identifying the needs of school-based agricultural education (SBAE) teachers can provide opportunities for professional development and pre-service teacher education, which can lead to retention of teachers in the profession (Smalley et al., 2019). Challenges continually facing new and veteran SBAE teachers include teaching practices and curriculum accessibility (Barry et al., 2022; Eck et al., 2019; Smalley et al., 2019). It is important to identify teacher needs on a regular basis to continue offering professional development opportunities relevant to current situations facing teacher populations (Avalos, 2011).

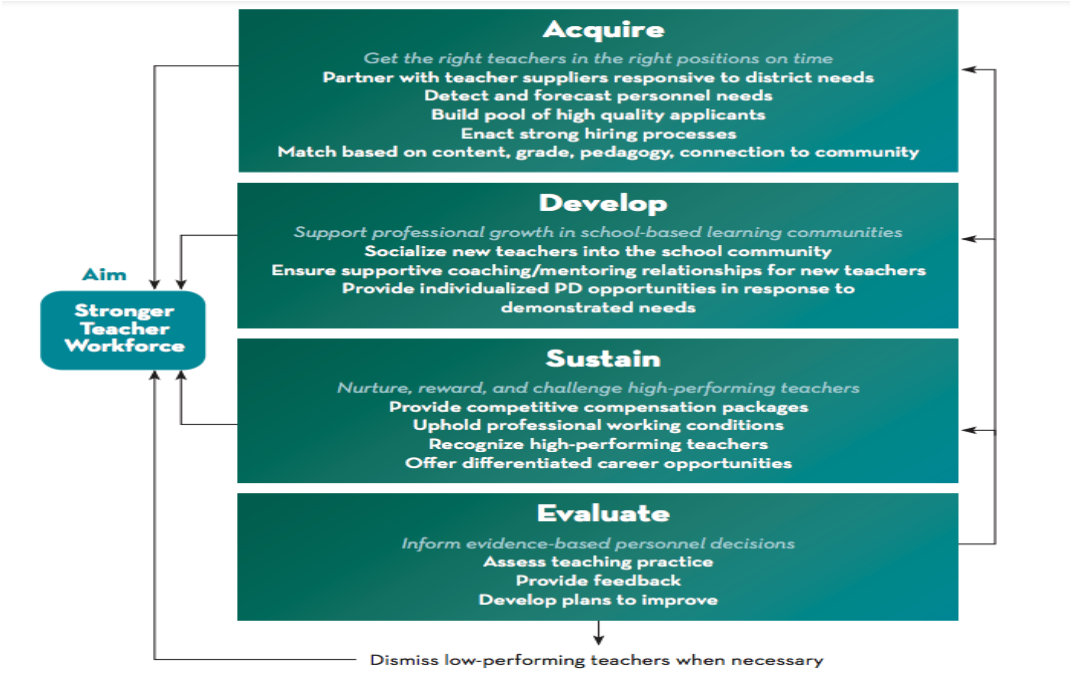
The purpose of this study was to identify the current level of knowledge and perceived relevance of teaching technical agricultural content topics in agricultural education by Oklahoma SBAE teachers. Specifically, technical agriculture topics across the eight agriculture, food and natural resources (AFNR) content pathways (The Council, 2023) were evaluated. This study looked to expand upon the work of Coleman et al. (2020) in looking at the professional practice needs of SBAE teachers. One overarching research question guided this study: What are the needs of Oklahoma SBAE teachers related to teaching technical agricultural topics, based on ranked discrepancy scores (RDS), in the eight technical agricultural content pathways?

Theoretical/Conceptual Framework

This study was undergirded by the Teacher Human Capital theory (Myung et al., 2013), which outlined four distinct areas for advancing teaching and improving learning (see Figure 1). The Teacher Human Capital framework is presented as a systems approach with four criteria (i.e., acquire, develop, sustain, and evaluate) working together to explore teacher recruitment, development, reward, and retention (Myung et al., 2013). This study focused on the criteria of *develop* and *evaluate* specifically. *Develop* outlines the need to "provide individualized PD opportunities in response to demonstrated needs" (Myung et al., 2013, p. 8); while *evaluate* highlights the need to "assess teaching practice" and "provide feedback" (Myung et al., 2013, p. 8), which is essential in the human capital development of SBAE teachers (Eck et al., 2021). Figure 1 outlines the model focusing on a stronger teacher workforce with four primary criteria.

Figure 1

Teacher Human Capital Framework



Note. From "A Human Capital Framework for a Stronger Teacher Workforce" (Myung et al., 2013, p. 8).

Methodology

This non-experimental survey research study employed a census approach to reach all Oklahoma SBAE teachers (N = 462). To achieve this goal, data was collected in-person at 25 regional FFA degree checks across the state. In Oklahoma, all teachers attend FFA degree checks in their designated region over a two-week period in late January and early February. The research team traveled the state to provide an overview of the needs assessment, distribute the survey instrument and collect completed hand-written questionnaires. Three-hundred and thirty-eight Oklahoma SBAE teachers returned a survey questionnaire, resulting in a 73.2% response rate.

Although this study resulted in a 73.2% response rate, non-response error is still of concern, given the census approach design. Therefore, 55 survey instruments were mailed, along with a cover letter and pre-paid return addressed envelope to Oklahoma SBAE teachers who did not attend the state degree checks. The 55 Oklahoma SBAE teachers who received the questionnaire did not have a chance to complete the instrument at the degree checks due to weather related cancelations or travel limitations. This effort resulted in five SBAE teachers completing and returning the survey instrument to the research team. After analysis of non-respondents (i.e., comparing the results of the non-respondents to the 338 original respondents), data were found to be non-differential from the original respondents. Incomplete survey questionnaires were excluded, resulting in 328 (71.0% response rate) completed instruments for data analysis.

Two-hundred fifty-nine participants were traditionally certified in agricultural education, while and additional seven were found to be traditionally certified in other content areas. Forty-nine participants were identified as having an alternative certification, with an additional 10 having an emergency certification. Participants indicated having achieved either a bachelor's (n = 247), master's (n = 78), or an EdD/PhD (n = 1) for their highest degree earned. Respondents were primarily male (69.9%), spanning single (60.0%) and multi-teacher (40.0%) programs. Lastly, participants were able to select all races/ethnicities that constitute their being, resulting in 247 self-identified as white, 56 as Native American, three as Hispanic, two as Black/African American, and one participant self-identified as Asian.

Instrumentation

The questionnaire was developed by Roberts and Dyer (2004) and modified by Saucier et al. (2010), Figland et al. (2019), and Coleman et al. (2020). The instrument was adopted and further modified for this study to fit the needs of Oklahoma school-based agricultural education (SBAE) teachers. A panel of experts then reviewed the instrument for face and content validity. This panel included (a) one university faculty member of agricultural education, (b) the state FFA advisor, (c) one regional agricultural education program specialist, and (d) two school superintendents who were previously SBAE teachers.

In total, the questionnaire included 57 items related to teaching technical agriculture across the eight content pathways identified by The Council (2023). Each of these items used two, 5-point Likert-type scales (1 = low agreement, 5 = high agreement). The first scale asked participants to rate their current knowledge level of the item (perceived ability, while the second focused on the degree of relevance the item had to their job (perceived importance).

Data Analysis

All data were transcribed from the paper instruments to Microsoft Excel© by a single research assistant prior to data being imported and analyzed using SPSS version 28 and Microsoft Excel©. This study implemented the ranked discrepancy model (RDM) to assess current competencies of SBAE teachers across Oklahoma. This model was selected as an alternative to the Borich (1980) needs assessment model based off the findings of Narine and Harder (2021). Specifically, this method was selected because "instead of positive scores indicating a lack of competence, the RDM provides a negative [ranked discrepancy score] RDS when training needs are greater (i.e., there are many individuals lacking sufficient ability and few individuals with an abundance of ability), which more clearly conveys that a problem exists that should be corrected" (Narine & Harder, 2021, p. 108). This analysis requires the consideration of positive ranks (PR), negative ranks (NR), and tied ranks (TR) to fully understand the needs of the participants, ranging from those deemed experts to others who are novices, resulting in an RDS for each item (Narine & Harder, 2021).

Findings

After analysis and organization of the data, it was found that RDS scores ranged between -26.743 and -2.766, indicating a discrepancy between the perceived level of knowledge and

relevance to the SBAE teachers' career field. These discrepancies with negative scores indicated SBAE teachers have a higher perceived relevance to their career field and a lower perceived level of knowledge (Narine & Harder, 2021). Agribusiness Systems was found to have the highest average RDS in its top four items compared to other pathways (-24.519). Food Products & Processing Systems was found to have the lowest average RDS among its top four items compared to the other pathways (-9.017) (see Table 1). Table 1 outlines all eight AFNR content pathways, the top three perceived items and the corresponding RDS.

Table 1

Ranked Discrepancy Scores for Teaching Technical Agricultural Topics

Content Pathway	Item	RDS
Agribusiness Systems	Economics	-26.443
	Recordkeeping Skills	-24.620
	Issues in Global Agriculture	-22.492
Animal Systems	Animal Diseases/Parasites	-18.845
	Animal Nutrition	-14.590
	Animal Production	-12.158
Biotechnology Systems	Genetic Engineering	-25.836
	Evolution of Biotechnology	-22.796
	Aseptic Systems[a]	-20.973
Environmental Service Systems	Global Positioning Systems (GPS)	-24.012
	Water & Wastewater Treatment	-21.277
	Biofuels/Alternative Energy	-20.365
Food Products & Processing Systems	Meat Science	-10.334
	Standards and Regulations	-9.119
	Food Preparation[a]	-7.599
Natural Resource Systems	Entomology	-21.277
	Precision Agriculture	-17.021
	Renewable Energy	-17.021
Plant Systems	Turfgrass Management	-26.748
	Tissue Culturing	-25.532
	Landscaping	-19.453
Power, Structural & Technical Systems	Agricultural Mechanics Project Construction	-21.277
	Electricity	-16.413
	Agricultural Structures (i.e., building construction, concrete, etc.)[a]	-13.678

Note. [a] indicates additional items (max. 1) had the same RDS score as the item indicated in table.

The final rank order of the technical agricultural content pathways, based upon the RDS, was 1) agribusiness systems, 2) plant systems, 3) biotechnology systems, 4) environmental service systems, 5) natural resource systems, 6) power, structural & technical systems, 7) animal systems, and 8) food products & processing systems.

Conclusions, Implications, and Recommendations

SBAE teachers in Oklahoma identified a need related to all 57-items associated with teaching technical agricultural topics across the eight content pathways, aligning with nationwide training needs related to classroom instruction (Albritton & Roberts, 2020; Layfield & Dobbins, 2002; Smalley et al., 2019). The greatest need, based on RDS, was in agribusiness systems followed by plant systems and biotechnology systems. This aligns with the long-standing focus of SBAE programs in Oklahoma being related to animal science and agricultural mechanics. Agribusiness and biotechnology are newer focus areas as many programs expand their capacity with additional SBAE teachers (Marsh et al., 2023). This change in focus areas could be an implication of the change in technical and teaching needs in a post-COVID pandemic era.

Overall, the statewide needs assessment provided an opportunity for the research team to *evaluate* the teacher human capital, by allowing SBAE teachers to provide input based on their personal decision making and needs within their classroom (Myung et al., 2013). Providing SBAE teachers with an opportunity to self-evaluate and reflect on their practice leads to increasing their overall career specific human capital and their teaching effectiveness (Eck et al., 2021). In this case of this study, the needed career specific human capital relates to technical agriculture content knowledge to further student engagement in relevant content and curriculum (Barry et al., 2022; Eck et al., 2019; Smalley et al., 2019).

Ultimately, the findings of this study should be used to guide professional development in Oklahoma, as these are the current needs associated with the majority (71.0%) of SBAE teachers in Oklahoma (Avalos, 2011). Focusing on teacher development through the lens of the needs assessment helps to advance and improve participating teachers (Layfield & Dobbins, 2002). Furthermore, this purposeful professional development targeted at teacher's needs, corresponds with the *develop* function of the teacher human capital framework (Myung et al., 2013). Additional research is needed to determine the preferred method of receiving professional development to best meet the needs of SBAE teachers across Oklahoma. As this type of needs assessment resulted in positive outcomes in multiple states to date, it is recommended this study be replicated in states where needs assessment have not been conducted in the past five years.

Conducting needs assessments provide SBAE supporters (i.e., SBAE teacher preparation faculty, state FFA and agricultural staff, and career and technical education directors) an opportunity to determine state specific needs and provide purposeful professional development, resulting in impactful research. It is also imperative to identify pre-service teacher needs as they journey through their post-secondary coursework. It is recommended that a modified version of this study be utilized to identify perceived knowledge level of different technical agricultural topics in the eight AFNR content pathways and their perceived importance to their teaching career. Conducting this study each semester can allow for a longitudinal study of different teaching cohorts, as well as, allow for faculty advisors to assist pre-service teachers in course selection as they proceed through their post-secondary educational programs.

References

Albritton, M. C., & Roberts, T. G. (2020). Agricultural technical skills needed by entry level agriculture teachers: A modified Delphi Study. *Journal of Agricultural Education, 61*(1), 140–151. https://doi.org/10.5032/jae.2020.01140

Avalos, B. (2011). Teacher professional development in teaching and teacher education over ten years. *Teaching and Teacher Education, 27*(1), 10–20. https://doi.org/10.1016/j.tate.2010.08.007

Barry, D., Warner, A. J., LaRose, S., Colclasure, B., & Osborne, E. (2022). Personal resilience of first-year, alternatively certified agriscience teachers. *Advancements in Agricultural Development, 3*(1), 103–114. https://doi.org/10.37433/aad.v3i1.183

Borich, G. D. (1980). A needs assessment model for conducting follow-up studies. *Journal of Teacher Education, 31*(3), 39. https://doi.org/10.1177/002248718003100310

Coleman, B. M., Bunch, J. C., & Thoron, A. C. (2020). Identifying agriscience teachers' instructional practice professional development needs by certification type. *Journal of Agricultural Education, 61*(3), 86–100. https://doi.org/10.5032/jae.2020.03086

The Council. (2023, January 24). *AFNR standards*. The National Council for Agricultural Education. Retrieved April 25, 2023, from https://thecouncil.ffa.org/afnr/

DiBenedetto, C. A., Willis, V. C., & Barrick, R. K. (2018). Needs assessments for school-based agricultural education teachers: A review of literature. *Journal of Agricultural Education, 59*(4), 52–71. https://doi:10.5032/jae.2018.04052

Eck, C. J., Robinson, J. S., Cole, K. L., Terry Jr., R., & Ramsey, J. W. (2021). Identifying the characteristics of effective school-based agricultural education teachers: A national census study. *Journal of Agricultural Education, 62*(3), 292–309. https://doi.org/10.5032/jae.2021.03292

Eck, C. J., Robinson, J. S., Ramsey, J., & Cole, K. (2019). Identifying the characteristics of an effective agricultural education teacher: A national study. *Journal of Agricultural Education, 60*(4), 1–18. https://doi.org/10.5032/jae.2019.04001

Figland, W. L., Blackburn, J. J., Stair, K. S., & Smith, E. H. (2019). What do they need? Determining differences in the professional development needs of Louisiana agriculture teachers by years of teaching experience. *Journal of Agricultural Education, 60*(2), 173–189. https://doi.org/10.5032/jae.2019.02173

Layfield, K. D., & Dobbins, T. R. (2003). Inservice needs and perceived competencies of South Carolina agricultural educators. *Journal of Agricultural Education, 43*(4), 46–55. https://doi.org/10.5032/jae.2002.04046

Marsh, K. N., Rankin III, K., Eck, C. J., & Smith N. A. (2023, May 14-18). *Determining the needs of school-based agricultural education teachers in Oklahoma* [Paper Presentation]. 2023 National AAAE Conference, Raleigh, NC. https://aaea.wildapricot.org/resources/Documents/National/2023Meeting/23_AAAE_Proceedings_combined_FINAL.pdf

Myung, J., Martinez, K., & Nordstrum, L. (2013). *A human capital framework for a stronger teacher workforce. advancing teaching: Improving learning. White Paper*. Distributed by ERIC Clearinghouse. Retrieved 2023, from https://www.carnegiefoundation.org/wp-content/uploads/2013/08/Human_Capital_whitepaper2.pdf.

Narine, L. K., & Harder, A. (2021). Comparing the Borich model with the ranked discrepancy model for competency assessment: A novel approach. *Advancements in Agricultural Development, 2*(3), 96–111. https://doi.org/10.37433/aad.v2i3.169

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

Saucier, P. R., Tummons, J. D., Terry R., & Schumacher, L. G. (2010). *Professional development inservice needs of Missouri agricultural educators* [Paper presentation]. American Association for Agricultural Education Research Conference, Omaha, NE. http://aaaeonline.org/resources/Documents/National/AAAE_2010_Conference_Proceedings. pdf

Smalley, S., Hainline, M., & Sands, K. (2019). School-based agricultural education teachers' perceived professional development needs associated with teaching, classroom management, and technical agriculture. *Journal of Agricultural Education, 60*(2), 85–98. https://doi.org/10.5032/jae.2019.02085

Stripling, C. T., & Ricketts, J. C. (2016). Research priority 3: Sufficient scientific and professional workforce that addresses the challenges of the 21st century. In T. G. Roberts, A. Harder, & M. T. Brashears (Eds). *American Association for Agricultural Education national research agenda: 2016-2020* (pp. 29–35). Gainesville, FL: Department of Agricultural Education and Communication.

Strategies Behind the Communications: An Analysis of Social Media Platforms and Online Communication Channels Utilized by Agricultural Organizations in Texas

Introduction

An organization's foundation for success lies within its communication efforts and public reputation. As an organization begins to expand its reach and increase interactions with the general public, communication strategies become even more vital to success (Baker, 2002). Warwick et al. (2021) stated organizations are responsible for upholding members' expectations when it comes to communication efforts. Stakeholders look for organizations to utilize new interactive forms of communication that came with the development of Web 2.0 (Berthon et al., 2012) which shifted the marketing power from the firm to the consumer (Hanna et al., 2011).

Social media and online communication have seen an increase in popularity in the last decade for being a low-cost marketing tool (Best et al., 2014). As the use of social media has progressed, businesses are using these platforms to gain a competitive advantage and provide a higher level of communication performance (Lamberton & Stephen, 2016). Despite the recognition of the importance of a presence online, many organizations have not created a formal strategy for their social media and online presence (Choi & Thoeni, 2016).

Agricultural organizations are typically seen as advocacy groups who provide insight into the public's perception and knowledge of agricultural issues (Qu et al., 2018: Schuett et al., 2001). In Texas there are many agricultural organizations of different sizes and scope. Many of these organizations are members of an informal organization called the Texas Agriculture Council (TAC). TAC is a voluntary council comprised of agricultural organizations within the state with direct interest in legislative matters. TAC does not take political positions on any matters or take any political action. The council provides an opportunity for its members to gather for discussion regarding regulatory topics and legislative matters affecting the state's agriculture (TAC, n.d.). The mission of TAC is to serve as a "forum of organizations whose members depend upon agriculture for their livelihood" (*About Us*, 2020, para. 1). TAC was identified as the most comprehensive list of agricultural organizations in Texas by the researcher and was used as the population for the study.

Theoretical Framework

Ledingham and Bruning's (1998) Organizational Public Relations Theory states an organization's communication effectiveness is contingent on the condition of the relationship between the organization and public. This study utilized this theory to explore how agricultural organizations communicate to and build a relationship with their external audiences. The basis of the theory is rooted in previous research conducted by Grunig (1993), which suggested a relationship between an organization and its key public is deemed successful when it is mutually beneficial for both sides. A two-way symmetrical model was put forth proposing public relations is a continuous exchange between an organization and its key public (Grunig, 1993). Based on literature established by Grunig (1993) and Broom et al. (1997), Ledingham and Bruning (1998) defined five dimensions of creating, developing, and maintaining an organization-public relationship: trust, openness, involvement, investment, and commitment. Ledingham and

Bruning (1998) claimed these five dimensions could assist an organization in determining public choices relating to organizational involvement. Organizations must understand and implement the two-step process of 1) focusing on the relationships with the public and 2) communicating the organization's involvement in the public to generate loyalty throughout the community (Ledingham & Bruning, 1998). Also, stakeholders have a positive leaning toward organizations who are actively involved and supportive of the community. The key for agricultural organizations is to build mutually beneficial relationships with members that increase community throughout the agricultural industry (Ledingham, 2001). This study aimed to analyze the agricultural organizations' use of social media and online communication channels to determine how each organization is maintaining its organization-public relationship online.

Purpose and Objectives

The purpose of this study was to explore how agricultural organizations in Texas utilize various communication tools when communicating to their members and followers. A two phase, mixed methods study was created to analyze this subject and evaluate the communications managers' strategies. The following research objective guided the first phase:

1. Identify social media platforms and online communication channels, content type, and frequency utilized by agricultural organizations in Texas.

The following research objectives guided the second phase of research:

2. Explore organizations' communications directors' communication strategies when utilizing a social media platform to communicate with their audience.
3. Gain insight into the communications directors' assessment of the social media success.

Methods

In phase one, a communications audit was conducted to gain a better understanding of the various platforms and tools being utilized by these organizations. This study focused specifically on external communication that was publicly available for the communications audit. If the researcher could not view the material, then it was not counted or included in the findings. The researcher was able to identify specific social media platforms and online communication channels each agricultural organization utilized, what types of content was published, and how frequently each platform/channel was updated. The population for phase one of this study was comprised of all agricultural organizations that are members of TAC. Purposeful sampling was utilized to identify the state-based agricultural organizations. This eliminated any national organizations or corporations that were also members of TAC. All TAC state-based agricultural organizations (n = 63) were included in the communications audit. A codebook was developed based off research conducted by Butler (2022) to collect the data. All data were coded by the lead researcher. At the conclusion of data collection, the researcher utilized a Microsoft Excel spreadsheet and ran descriptive statistic tests and frequency counts for each coded variable.

The quantitative phase one research directly influenced the purpose and design of the phase two interviews. It was apparent that many of these organizations had a strong presence on social media. Therefore, the researcher focused on the organization's presence on social media when creating the instrument for phase two. The researcher created an interview guide also based off

Butler's existing instrument (2022) that consisted of 37 open-ended questions. The population for this phase consisted of TAC members, then criterion sampling was utilized to identify the members strategically using social media to communicate with the public and have posted at least once a month. The researcher identified 38 agricultural organizations that met this set of criteria. Eight answered interview requests, and all interviews were conducted in December 2022. Once each interview was complete, the researcher transcribed the text using Otter.ai, edited the transcriptions for clarity and comprehensiveness, and removed any identifying factors. Open coding was then utilized to code the interviews into categories, followed by axial coding to create connections between the established categories and identify themes (Corbin & Strauss, 1990).

Trustworthiness, or rigor of a study, is accomplished through credibility, transferability, dependability, and confirmability in the study (Lincoln & Guba, 1985). To establish credibility, at the conclusion of data collection, transcripts were sent back to participants to allow them to review their answers and alter any phrases they had stated. An audit trail was established for this study by the researcher keeping detailed records of each step in both phases of the research process to establish dependability. Due to the distinct nature of the study, the results can only be used to explain the opinions and perceptions of those involved in the sample. Therefore, the findings of this study can only be applied to the organizations that are members of TAC. Confirmability was established by the researcher maintaining detailed notes through data collection, retaining all supporting documentation and existing data, and linking back all conclusions and interpretations to the data found.

Findings

Nine communication tools were analyzed in this study. However, only two, websites and Facebook had a majority presence from the sample. The other channels are not included in this paper due to their negligible presence.

Of the agricultural organizations in the sample, 58 (94%) utilized a website; however, two website links no longer work but still appear in a Google search. The majority of websites in the study (n = 53) were user-maintained sites, which means the organization, or a third-party entity maintains the updates for the website. The copyright dates on the website's ranged from 2016-2022. Of the user-maintained websites, 45% had a copyright date of 2022. This shows that the website and its information were updated or created within the current year when the data were collected. Of the organizations with websites, each site contained general information about the agricultural organization. The majority of the websites also contained information regarding events (n = 44), industry sector updates (n = 40), educational efforts (n = 37), and policy updates from the state or federal levels (n = 22).

Most of the agricultural organizations (n = 44, 69.8%) in the sample utilized a Facebook account. Each agricultural organization that utilized a Facebook account had uploaded content related to the organization's general activities. Following this, 90.1% shared content related to upcoming or past events; 59.1% organizations included educational information in the posts; 56.8% posted industry sector updates; 50% included political updates; 36.4% shared content related to

marketing, advertising, and sponsorships; and 29.5% included information about scholarships. information in the content uploaded. The frequency of posts on Facebook varied greatly between Most updated the page regularly with 47.7% posting two to three times per week.

Phase two consisted of semi-structured interviews that allowed insight into the agricultural organization's strategies for social media and online communication channels identified in phase one. All eight participants acknowledged the importance of social media and online communications within their organization. As Maggie stated, "in the digital age that we're in, it's important for us to be in as many places as we need to be" (Interview 6, pg. 9). Mary echoed this idea stating why her organization was so active on a variety of different channels was to "try to hit people in different ways where they're at. And we're able to do a lot of that in a cheaper way online" (Interview 8, pg. 3). Many of the participants acknowledged the importance of agriculture having a presence online and on social media.

Within social media strategies, there were multiple emergent themes, such as various type content on social media. Lizzie explained her strategy on Facebook by saying "I tend to do a healthy mix of all of it. So, I'll do feature stories on there. I'll do press releases If something's breaking. I'll ask questions. I'll poll the audience, I'll promote things. All that good stuff" (Interview 1, pg. 5). All six individuals talked about utilizing Instagram to reach younger audiences and establish brand recognition in their followers. Sophie described how her organization uses the Instagram feed by saying, "we're using that more as like a brand recognition piece. So, kind of build our brands, help create a community" (Interview 7, pg. 5). Twitter was unanimously agreed to be an internal, industry focused platform. As Katie noted "Twitter has become a really good resource for reaching farmers. And most of what we put out is farmer directed" (Interview 3, pg. 4).

Throughout the interviews, the participants spoke about their perceived strengths when it came to social media. A majority stated they believed consistency, authenticity, and intentionality were some of their strengths when it came to their organization's communication efforts. Lizzie valued authenticity and believed that everything posted should be representative of the organization:

> I think authenticity is your primary goal on all social media channels. I don't care what you are, who you are, what you're doing, we represent. If you want to engage with people on social media, you better be true to who you are. (Interview 1, pg. 6)

Out of the participants many expressed difficulties with the size of the communications department. Six out of the eight participants were a staff of one, with two having a college intern to assist them. Lizzie stated, "I think social media can be a full-time job very easily. And there are organizations and full social media teams, you know, copywriters, specifically for social media, with strategists specifically for social media." (Interview 1, pg. 11). Only one of the participants in this study was in a communications department with more than two people. Maggie explained that her communications department consisted of radio, video, graphic design, editors, field writers, and various other teams. When asked about her communications department, Mary simply said "I am the communications office" (Interview 8, pg. 2)

Three out participants also discussed how social media and online communication to external audiences can often get pushed off the priority list. As Annie explained, "we have a whole other host of duties. And so, social media is just one part of that. And, you know, like whenever you sit

down for your priority list every day, sometimes that's not at the top" (Interview 5, pg. 6). Sophie also echoed this idea in her interview:

> It's an extension of everything we do, but it's not the core component of the deed itself... things stop if the magazine doesn't get done or if an article doesn't get edited or a magazine doesn't get to print, but our operation does not stop if a tweet doesn't go out (Interview 7, pg. 9).

Conclusions, Recommendations, and Implications

This study indicated that agricultural organizations in Texas have a strong communication presence on very few different platforms and online channels. Facebook was the most popular social media platform used by agricultural organizations in this study. An organizational website was the most common use of a nonsocial, online communication channel. The communication directors interviewed in phase two represent prominent agricultural organizations that have a significant reach across the state. It should be noted these organizations are the leaders of the agricultural industry in Texas, and they have a well-rounded approach to communications based on their active presence across many different channels. These agricultural organizations have put forth the effort to have a relationship and generate loyalty with the industry, or community, which in turn has created a loyal membership. This is considered to be one of the main goals of the Organizational-Public Relationship Theory put forth by Ledingham and Bruning (1998).

It became apparent through the eight interviews conducted, that each social media platform and online communication channel had a different purpose. Facebook was largely considered a mixture of internal and external audiences. The content was applicable to not only members but nonmembers as well. Instagram was identified as a platform to reach younger audiences and maintain brand recognition. The content was not information based, but rather consumer focused. Among the six participants who utilized Twitter, it was unanimously agreed that the platform was internally focused, and industry driven. Because social media is used as a two-way communication tool, these agricultural organizations must place a larger emphasis on maintaining their pages. Allowing social media to fall in priority does not hurt the agricultural organizations' communication efforts, but it does not help their position either. Social media should be integrated into the organization's overall communication plan instead of being treated as a separate entity.

Based on the findings of this study, agricultural organizations should continue utilizing Facebook as a way to communicate on social media to both internal and external audiences. Agricultural organizations should also be active on multiple social media platforms. By frequently posting and maintaining an active status on these platforms, agricultural organizations would have a broader exposure to a wide range of demographics that could be useful in expanding the membership of an organization. It is also recommended the agricultural organization creates and maintains a website. Future research should be conducted to look further into these agricultural organizations' communication efforts due to the limited nature of the literature field. In addition to continuing to research into agricultural organizations use of social media and online communication channels, future research should also focus on the organization's members. By understanding the media and message preferences, an agricultural organization is better suited to effectively communicate to their target audience.

References

About Us. (2020, February 28). Texas Agriculture Council. https://txagcouncil.org/aboutus/

Baker, K. A. (2002). Organizational communication. Management Benchmark Study, 1(1), 1-3.

Bailey-Evans, F. (1994, May). *Enhancing the agricultural communications curriculum: A national Delphi study*. https://ttu-ir.tdl.org/handle/2346/61035

Berthon, P. R., Pitt, L. F., Plangger, K., & Shapiro, D. (2012). Marketing meets Web 2.0, social media, and creative consumers: Implications for international marketing strategy. *Business Horizons*, 55(3), 261–271. https://doi.org/10.1016/j.bushor.2012.01.007

Best, P., Manktelow, R., & Taylor, B. (2014). Online communication, social media and adolecent wellbeing: A systematic narrative review. *Children and Youth Services Review, 41*, 27–36. https://doi.org/10.1016/j.childyouth.2014.03.001

Broom, G. M., Casey, S., & Ritchey, J. (1997). Toward a Concept and Theory of Organization-Public Relationships. *Journal of Public Relations Research, 9*(2), 83–98. https://doi.org/10.1207/s1532754xjprr0902_01

Butler, R. (2022). Communicating Cooperatively: Exploring the Social Media Platforms and Online Communication Channels Utilized Among Agricultural Commodity Cooperatives [MS Thesis]. Texas Tech University.

Choi, Y., & Thoeni, A. (2016). Social media: is this the new organizational stepchild? European *Business Review, 28*(1), 21–38. https://doi.org/10.1108/ebr-05-2015- 0048

Center for Food Integrity. (2014). *Cracking the Code on Food Issues: Insights from Moms, Millennials and Foodies*. The Center for Food Integrity. https://www.foodintegrity.org/wp- content/uploads/2015/08/CFI2014ResearchBook.pdf

Connelly, L. M. (2016). Trustworthiness in Qualitative Research. *Medsurg Nursing, 25*(6), 435-436. https://www.proquest.com/scholarly-journals/trustworthiness- qualitative-research/docview/1849700459/se-2

Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology, 13*(1), 3–21. https://doi.org/10.1007/bf00988593

Grunig, J. (1993). Grunig, J. E. (1993). Public relations and international affairs: Effects, ethics, and responsibility. *Journal of International Affairs, 47*(1), 137-162.

Hanna, R., Rohm, A., & Crittenden, V. L. (2011). We're all connected: The power of the social media ecosystem. *Business Horizons, 54*(3), 265–273. https://doi.org/10.1016/j.bushor.2011.01.007

Kurtzo, F., Hansen, M. J., Rucker, K. J., & Edgar, L. D. (2016). Agricultural Communications: Perspectives from the Experts. *Journal of Applied Communications*, *100*(1). https://doi.org/10.4148/1051-0834.1019

Lamberton, C., & Stephen, A. T. (2016). A Thematic Exploration of Digital, Social Media, and Mobile Marketing: Research Evolution from 2000 to 2015 and an Agenda for Future Inquiry. *Journal of Marketing, 80*(6), 146–172. https://doi.org/10.1509/jm.15.0415

Ledingham, J. A., & Bruning, S. D. (1998). Relationship management in public relations: dimensions of an organization-public relationship. *Public Relations Review, 24*(1), 55–65. https://doi.org/10.1016/s0363-8111(98)80020-9

Ledingham, J. A. (2001). Government-community relationships: extending the relational theory of public relations. *Public Relations Review*, *27*(3), 285–295. https://doi.org/10.1016/s0363-8111(01)00087-x

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry.* Newbury Park, CA: Sage.

Polit, D. F., & Beck, C. T. (2014). *Essentials of nursing research: appraising evidence for nursing practice.* 8th ed. Philadelphia, Wolters Kluwer Health /Lippincott Williams & Wilkins.

Qu, S., Irani, T., & Lindsey, A. B. (2018). The Communication Effectiveness of Scientist-Stakeholder Partnerships Addressing Agriculture and Natural Resources Issues: A Citation Analysis of the Florida Water and Climate Alliance. *Journal of Applied Communications*, *102*(1). https://doi.org/10.4148/1051-0834.1755

Schuett, M. A., Selin, S. W., & Carr, D. S. (2001). Making It Work: Keys to Successful Collaboration in Natural Resource Management. *Environmental Management*, *27*(4), 587–593. https://doi.org/10.1007/s002670010172

Texas Agriculture Council. (2020, February 28). Background. https://txagcouncil.org/background/

Warwick, C. R., Rampold, S. D., Randolph, L., & Telg, R. W. (2021). Examining Communication Between Florida Agriculture and Natural Resource Organizations' Leaders and Membership to Foster Policy Engagement. *Journal of Agricultural Education*, *62*(4), 81–95. https://doi.org/10.5032/jae.2021.04078

A Case Study Using Q Methodology to Explore the Attitudinal Orientation of Sorghum Producers Toward Sustainable Agricultural Practices

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Introduction

Agricultural sustainability has become more prevalent, but the concept has proven to be difficult to define due to the various economic, environmental, and social indicators which impact the area (Gennari & Navarro, 2019). These indicators have played a significant role in the evolution of and interest in sustainable agriculture in the public and governmental spheres, with difficulties in any of the three areas spurring an increased interest in sustainable agriculture and inciting drastic changes, prompted by government, in agricultural practices and systems (Gold, 2021). This challenge has been compounded by increased public concern about agriculture's impact on climate change and the environment (Constance, 2010).

As public interest in conservation and sustainability increases and conservationists adapt their understanding of the human-nature relationship, an integral need has been introduced to use social science to explore the inherently social nature of conservation science, also known as conservation social science (Teel et al., 2018). This need becomes increasingly important as organizational and governmental agencies are working to encourage farmers to implement more sustainable agricultural practices, with the success and failure of conservation initiatives often hinging on the communicators understanding and integration of stakeholder perspectives in resolving conflict (Madden & McQuinn, 2014). Most studies have evaluated farmer perceptions of climate change. Research has consistently found most farmers believe in climate change, but their beliefs of the causes vary (Arbuckle et. al, 2013; Chatrchyan et al., 2017; Colston et. al, 2019).

Farmers tend to agree more with messages promoting adaptation to climate change, rather than messages promoting the mitigation of climate change, preferring grassroots efforts to adopt locally or regionally over government action to mitigate nationally (Arbuckle et. al, 2013). Farmers will often adapt to climate change, even if they do not believe in the concept. The same farmers will often not support mitigation efforts, even if there is a perceived risk (Chatrchyan et al., 2017). Farmers willing to adapt to climate change often will do so because of a perceived changes in the local environment, whereas those willing to implement mitigation strategies were more influenced by a perceived global and societal risk (Chatrchyan et al., 2017).

In September 2022, National Sorghum Producers (NSP) received a $65 million grant from the Partnerships for Climate-Smart Commodities funding opportunity to finance a pilot project focused on implementing climate-smart practices on sorghum acreage for the purpose of reducing carbon emissions and developing specialized markets for climate-smart sorghum (United States Department of Agriculture, 2022b). Sorghum has the potential to bode well in a new "sustainable era" for agriculture because of its characteristics like drought tolerance, large

root systems, perennial production, carbon sequestration, conservation tillage methods, and integration in wildlife conservation (NSP, 2022; USCP, 2022a; USCP, 2022b).

This funding creates a need for NSP to communicate about this program to producers so as to encourage them to participate. While sorghum's innate biological qualities and commonly used practices among farmers lend well to the Partnerships for Climate-Smart Commodities funding opportunity, little is known about sorghum farmers' perceptions of agricultural sustainability.

Purpose and Objective

This study sought to describe the attitudes of sorghum producers in leadership positions in NSP toward agricultural sustainability. Exploring this objective would allow NSP to develop a comprehensive communications plan with messages based on the sustainability perspectives of the producers. The following research question was sought: What attitudinal orientations are present in sorghum producers in leadership and influential positions within NSP?

Methodology

Semiqualitative Q Methodology (hereafter Q) was used in this study to evaluate sorghum producers' perspectives toward agricultural sustainability. Q is used to study subjectivity of individuals on a specific topic and the varying individual perspectives on an issue which could inspire multiple points-of-view (Brown et al., 2008; Stenner et al. 2008). This method focuses on similarities between individuals, rather than between questions or variables (Zabala et al., 2018). There are seven stages in the Q process: defining and building the concourse, developing the Q set, selection of the P set, conducting the Q sort, post Q interviews, analysis, and interpretations (Damio, 2016).

"The 'concourse' is the collection of possible statements people make about the topic" (Damio, 2016, p. 107). This collection of statements is raw material representative of the existing opinions and arguments made by a diverse group of individuals about the topic. The concourse for this study was developed through naturalistic methods where the researched attended discussions between NSP staff and sorghum producers who were members of the organization and served in one or a combination of leadership roles (Damio, 2016; McKeown & Thomas, 2013). The raw material of the concourse, Q population, is developed into a subset of statements, the Q sample, for presentation to research participants in the form of a Q sort (Brown, 1993). Researchers are encouraged to develop a Q sample with pragmatism, assuring diversity of opinions are represented but not so many statements as to overwhelm the participant (Brown, 1993; Kamal et al., 2014). Once the Q sample is selected, it is presented to participants in the form of a Q sort where they are asked to rank them from most like them to least like them. From this ranking the varying subjective perspectives of the topic emerge (Brown, 1993).

For the development of the Q set, the researcher utilized the theoretical structure as employed by Jones (2003) and Kramer et al. (2003), a 2x2 matrix was developed with "two main dimensions with two 'levels' within each of these" (Kramer et al., 2003, p. 345). The two main dimensions that emerged in this study were the perspectives with which sorghum farmers viewed sustainability—individualistic and collectivist—and the levels that emerged were the pressures

that drove farmers to adapt their farming methods to more sustainable agricultural practices—economic/political and biophysical/social. Five statements most representative of each of the four cells were developed, resulting in a Q set of 20 items reflecting both positive and negative assertions to at least one of the dimensions or levels within the designated cell (Jones, 2003; Kramer et al. 2003). For the purposes of this survey, the researcher adapted this traditional format for electronic distribution within the Qualtrics™ online survey tool.

Once the 20 item Q set was drawn, the entire survey was redistributed to a panel of experts to test for content validity (Valenta & Wigger, 1997). The panel of experts in sorghum production and agricultural sustainability found the instrument to be valid.

The third stage of Q is the selection of the P set, or participants. Q seeks respondents theoretically relevant to the problem and diverse in their opinions, typically between 12 to 36 participants (Damio, 2016; Kamal al., 2014). This study sought to describe the attitudinal orientations of sorghum producers in leadership and influential positions in the industry toward agricultural sustainability, so this survey was distributed to members of the NSP Board of Directors, NSP Legislative Committee, the United Sorghum Checkoff Program Board of Directors, and current and past participants of Leadership Sorghum. There were 101 people in this group, and 41 completed the survey.

The fourth step of Q is conducting the Q sort. Data collection took place over three weeks in February and March 2023. The research instrument was designed in the form of an electronic survey created in Qualtrics™ and distributed via emails from the NSP staff. Participants began by ranking each Q set statement into a quasi-normal distribution array by placing the statements they most agreed with on the positive side of the array (0 through +4) and statements they least agreed with on the negative side (0 through -4).

Like adapting the traditional in-person Q sort instrumentation for electronic distribution, the fifth step of Q, the post Q interview, was adapted as well. According to Damio (2016), the post-Q interview's purpose is to have participants explain their reasoning behind their placement of the cards on the Q sort grid. In this study, respondent reasoning was inferred through their selections on questions about their succession planning and their completion of the statement, "*There will be enough natural resources (including water) to sustain the farm in the next generation because..."* Additionally, respondents ranked five incentives to adopt new practices from *most important* to *least important*. Respondents self-reported their farm and personal demographics, as well as their likelihood of adoption and implementation status of agricultural suitability practices. These questions took the place of the post Q interview. Primary data analysis for the Q sort was performed using the online program, Q Method Software.

Once the Q sorts for each participant were entered into the software, a Pearson product-moment correlation was run to determine the strength and direction of the linear relationships between the Q sorts (Kline, 1994; Watts & Stenner, 2005). After correlation, the factors were extracted through Principal Components Analysis (Du Plessis, 2005; Watts & Stenner, 2012). This resulted in a correlation matrix for each of the 41 participants and their loadings on eight factors. Also shown were the eigenvalues and percent of explained variance for each factor. Factors were selected for interpretation by using the two or more significantly loading Q sorts at

the 0.05 level, which for this study was calculated by 1.96 * $(1/\sqrt{20}) = \pm 0.49$ and resulted in four factors (Brown, 1980).

Following factor extraction, a varimax rotation was run because the purpose of this study was exploratory and inductive, seeking to capture the majority opinions (Watts & Stenner, 2012). The varimax rotation is an objective and reliable form of rotation which works to capture most of the study variance, and the researcher's decision on which form of factor analysis to use is guided by the purpose of the study (Watts & Stenner, 2102). Next, factor loadings for each of the 41 participants were reported. The researcher selected participants to be loaded onto each factor by selecting the participants that had a significant loading onto only one factor at the 0.05 level.

Results

Following the varimax rotation, 39 of the sorts were accounted for in one of the three factors extracted. This loading of 39 of the 41 total sorts gave a loading percentage of 95.12%. Reliabilities for Factors A, B, C and D are 98, 97, 96, and 94 respectively. Nine of the sorts were confounded in that they loaded on to more than one factor and two of the sorts were not significant in that they did not load onto any of the four factors (Watts & Stenner, 2012). It should be noted that one of the factors extracted by the varimax four-factor rotation was bi-polar (Factor C) resulting in Factor C+ and, the inverse, Factor C-.

The *Financially Concerned Pragmatics* (Factor A) focused on their bottom lines and were not willing to sacrifice economic profitability for environmental progress. They believed agricultural practices effective on other operations or in other regions would not necessarily be effective on their operations. These producers held strong beliefs that the government should not dictate what sustainable practices they should implement but could be influenced to implement sustainable practices through voluntary government programs with financial incentives. While they believed sustainability meant leaving the land and farming operation better than it was before they had it, they prioritized the current economic and agronomic state of their farm more than sustainability.

The *Forward-Thinking Evolvers* (Factor B) believed by making sustainable decisions now, they will improve the future economic and agronomic potential of their farms. They felt they had a role to play in improving the global environment and thus were the most willing to adapt their farming practices from what had been done by previous generations and the most conscious of the limited availability of natural resources. However, they did not approve of government mandating the implementation of sustainable practices. While these producers still placed strong consideration on how the implementation of sustainable practices will impact the income and yield potential of a crop, they were willing to sacrifice short-term profitability for what they believed will be long-term profitability and agronomic productivity.

The *Exploratory Implementers* (Factor C+) were willing to explore what sustainable practices farmers, whether neighboring or in other regions, were adopting when developing options for their own operation. However, they must determine if the practices would be economically viable on their own operations before implementation. These producers believed the actions they took on their operations impacted the regional and global environment and felt the government should compensate them for positive contributions in this area through

voluntary, not mandated programs. These producers were willing to diverge from how the farm had been operated by previous generations but did not feel it was necessary to implement sustainable practices for the farm to be productive for the next generation.

The *Independent Decision Makers* (Factor C-) believed they knew how best to care for their land and their farm and did not what their on-farm decisions directed by those not involved in their operation, including the government. They believed that implementation of sustainable practices was vital to ensuring their land was profitable and productive for future generations and were open to adopting new practices, but they did not believe the implementation of these practices had an impact outside of their operation. These producers believed regionality had a large impact on determining optimal sustainable agricultural practices.

The *Individualistic Self-Starters* (Factor D) believed there was room for improvement in agricultural sustainability, but the longevity of agricultural production meant producers had been improving and will continue to evolve in this area on their own accord. All these producers had already or were willing to adopt all sustainability practices listed in this study and felt these practices were beneficial to improving their operation's profitability. These producers believed they needed to diverge from how the farm had been managed by previous generations to best care for their land and farms. However, they did not believe implementing these practices had an impact on the environment beyond their farm, and thus felt government intervention in this space, either through voluntary programs or mandates, was unnecessary.

Conclusions and Recommendations

In looking for consensus, all the factors carried a level of concern about the economic impact of implementing sustainable practices on their operations. All factors were opposed to government mandates forcing farmers to become more sustainable and showed some level of hesitancy toward government programming. The *Financially Concerned Pragmatics*, *Independent Decision Makers*, and *Individualistic Self-Starters* believed the actions they took on their farms impacted only their operations. Whereas the *Forward-Thinking Evolvers* and the *Exploratory Implementers* believed the practices they employed had regional and global impacts on environmental health. While all factors were currently or willing to implement at least some sustainable agricultural practices, the *Financially Concerned Pragmatics*, *Exploratory Implementers*, and *Individualistic Self-Starters* were primarily motived by profitability and the *Forward-Thinking Evolvers* and the *Independent Decision Makers* were primarily motivated by long-term agronomic viability.

In developing a communications plan for their Partnerships for Climate-Smart Commodities program, NSP should prioritize messaging that establishes a connection between profitability and the implementation of sustainable agricultural practices. Emphasis should be placed on NSP as the managing entity, rather than the programs origins at USDA. Additionally, NSP should include messaging accentuating the voluntary aspect of this program. NSP should focus their messaging on participation in this program to adapt to a changing climate rather than as a tool to mitigate climate change (Arbuckle et al., 2013; Chatrchyan et al. 2017).

The *Forward-Thinking Evolvers* and the *Exploratory Implementers* are the most likely to be early participators in the NSP program. A proposed strategy is to use these operations as on-

farm demonstrations for non-participants to observe with detailed information available about the profitability for *Financially Concerned Pragmatics* and *Individualistic Self-Starters* and agronomic benefits for *Independent Decision Makers*

References

Arbuckle, J. G., Morton, L. W., & Hobbs, J. (2013). Understanding farmer perspectives on climate change adaptation and mitigation: The roles of trust in sources of climate information, climate change beliefs, and perceived risk. *Environment and Behavior 47*(2), 205 –234. https://doi.org/10.1177/0013916513503832

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

Brown, S. R. (1993, April/July). A primer on Q methodology. *Operant Subjectivity 16*(3-4), 91–138. https://doi.org/10.15133/j.os.1993.002

Brown, S. R., Durning D. W., & Selden, S.C. (2008). *Q Methodology*. In Gerald J. Miller and Kaifeng Yang (Eds.), *Handbook of Research Methods in Public Administration*. (2nd ed. pp. 721–763). CRC Press. http://www.blancopeck.net/Handbook.pdf

Chatrchyan, A. M., Erlbacher, N. T., Chaopricha, J. C., Tobin, D., & Allred, S. B. (2017). United States agricultural stakeholder views and decisions on climate change. *WIREs Climate Change 8*(5),1–21. https://doi.org/10.1002/wcc.469

Colston, N. M., Vadjunec, J. M., & Fagin, T. (2019). It is always dry here: Examining perceptions about drought and climate change in the Southern High Plains *Environmental Communication 13*(7), 958–974. https://doi.org/10.1080/17524032.2018.1536071

Constance, D. H. (2010). Sustainable agriculture in the United States: A critical examination of a contested process. *Sustainability, 2*(1), 48-72. https://doi.org/10.3390/su2010048

Damio, S. M. (2016). Q methodology: An overview and steps to implementation. *Asian Journal of University Education, 12*(1), 106–122. https://eric.ed.gov/?id=EJ1207820

Du Plessis, C. (2005). A theoretical framework of corporate online communication: A marketing public relations (MPR) perspective. [Thesis, University of South Africa, Pretoria]. UnisalR. http://hdl.handle.net/10500/2271

Gennari P., & Navarro D. K. (2019). The challenge of measuring agricultural sustainability in all its dimensions. *Journal of Sustainability Research 1*(e190013), 1–15. https://doi.org/10.20900/jsr20190013

Gold, M. V. (2021). *Tracing the evolution of organic/sustainable agriculture: A selected and annotated bibliography*. (V. S. Gordon, Ed.). National Agricultural Library. https://www.nal.usda.gov/legacy/afsic/tracing-evolution-organic-sustainable-agriculture

Jones, K. J. (2003). Attitudinal variability among southern High Plains cotton producers toward integrated crop/livestock systems [Master's thesis, [University]. [University] Libraries Electronic Thesis and Dissertations. http://hdl.handle.net/2346/16608

Kamal, S., Kocór, M., & Grodzinska-Jurczak, M. (2014). Quantifying human subjectivity using Q method: When quality meets quantity. *Qualitative Sociology Review 10*(3), 60–79. https://doi.org/10.18778/1733-8077.10.3.03

Kline, P. (1994). *An easy guide for factor analysis*. Routledge.

Kramer, B., Hegedus, P. D., & Gravma, V. (2003). Evaluating a dairy herd improvement project in Uruguay: Testing and explaining Q methodology. *Proceedings of the Annual Association for International Agricultural Extension Education Conference, 70*(2), 341–352. https://doi.org/10.5191/jiaee.2003.10205

Madden, F. & McQuinn, B. (2014). Conservation's blind spot: The case for conflict transformation in wildlife conservation. *Biological Conservation 178*, 97–106. https://doi.org/10.1016/j.biocon.2014.07.015

McKeown, B., & Thomas, D. (2013). *Q methodology*. Sage.

National Sorghum Producers. (2022). *National Sorghum Producers partnerships for climate-smart commodities project narrative.* [Unpublished manuscript] United States Department of Agriculture.

Stenner, P., Watts, S., & Worrell, M., (2008). Q methodology. In C. Willig & W. Stainton-Rogers, (Eds.), *The Sage Handbook of Qualitative Research in Psychology* (pp. 215–239). Sage.

Teel, T. L., Anderson, C. B., Burgman, M. A., Cinner, J., Clark, D., Estévez, R. A., Jones, J. P., McClanahan, T. R., Reed, M. S., Sandbrook, C., & St. John, F. A. (2018). Publishing social science research in Conservation Biology to move beyond biology. *Conservation Biology, 32*(1), 6–8. https://doi.org/10.1111/cobi.13059

United States Department of Agriculture. (2022a). *Partnerships for Climate-Smart Commodities*. https://www.usda.gov/climate-solutions/climate-smart-commodities

United States Department of Agriculture. (2022b). *Partnerships for Climate-Smart Commodities project summaries*. https://www.usda.gov/climate-solutions/climate-smart-commodities/projects

United Sorghum Checkoff Program. (2022a). *Sustainability*. https://www.sorghumcheckoff.com/sorghum-sustains

United Sorghum Checkoff Program. (2022b). *What is sorghum?* https://www.sorghumcheckoff.com/sorghum-101/what-is-sorghum/

Valenta, A. L. & Wigger, U. (1997). Q-methodology: Definition and application in health care informatics. *Journal of the American Medical Informatics Association 4*(6), 501–510. https://doi.org/10.1136/jamia.1997.0040501

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

Watts, S. & Stenner, P. (2012). *Doing Q methodology: Theory, method and interpretation*. SAGE Publications Ltd.

Zabala, A., Sandbrook, C., & Mukherjee, N. (2018). When and how to use Q methodology to understand perspectives in conservation research. *Conservation Biology 32*(5), 1185–1194. https://doi.org/10.1111/cobi.13123

Vicariously Visiting an Agricultural Facility: Exploring Student Perceptions of an Interactive Virtual Tour

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Introduction/Theoretical Framework

During the COVID-19 pandemic, the onset of international travel bans caused the tourism industry to face tremendous loss (LaBreck, 2022). To keep the world's sense of wanderlust alive, virtual tours of cities, landmarks, museums, and even national parks, were created and offered to the public (Jones, 2020). While the pandemic may have popularized virtual tours, they have been used in educational settings as alternatives to traditional, on-site field trips for several years. Used as experiential learning opportunities, field trips take students to locations and give them experiences that typically cannot be replicated in a classroom setting (Behrendt & Franklin, 2014). This type of learning can help participants increase their knowledge, develop skills, and clarify personal values (Association for Experiential Education, 2023).

While field trips are valuable learning opportunities, they can be difficult to execute due to the physical location as well as financial, safety, and other logistical concerns (Cassady et al., 2008; Han, 2020). To overcome these challenges, virtual tours—along with electronic, online, and virtual field trip options—can be used as an alternative. These types of field trips and tours seek to simulate the traditional field trip experience through a variety of interactive features (Hosticka et al., 2002). A variety of virtual tours exist, all with varying features and levels of immersion and interactivity, thus making the term a bit ambiguous and subject to several interpretations (El-Said & Aziz, 2021). An interactive virtual tour (IVT) combines various multimedia content types with cutting edge 3-D spatial technology. They also often include curriculum and other supplemental materials to encourage the integration of these tours in educational settings (Mead et al., 2019). Virtual technologies have been used in a variety of educational contexts and subjects with particular emphasis in STEM subjects (science, technology, engineering, and math). Although prior literature is limited, virtual tours have been used in food and agricultural science education contexts as well (Herritsch et al., 2013; Karcher & Reid, 2018).

Virtual tours are also often used in non-formal educational settings and have been used to promote universities (De La Cruz, 2020), popular tourist destinations, museums, and landmarks (Institute of Museum and Library Services, n.d.). In food and agricultural sciences (FAS), websites such as National Agriculture in the Classroom, Virtual Farm Trips, and Ag Explorer all offer varying types of virtual tours pertaining to different agricultural processes, facilities, and sites, and even careers. Commodity organizations such as the National Pork Board and the Sorghum Checkoff have also utilized virtual technology to reach consumers, producers, and buyers (Jackson, 2021; National Pork Board, 2019). Virtual technologies not only increase learning opportunities inside of the classroom, but this technology also helps bridge the knowledge gap between the agricultural industry and consumers.

The Technology Acceptance Model guided this study. Davis (1985) created the Technology Acceptance Model (TAM) to measure one's intention to adopt various technologies. Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) are recognized as foundational pieces in the creation of the TAM, as they both seek to predict and measure behavioral intention in some capacity (Marangunić & Granić, 2014). TAM has been used in a variety of contexts but is most often used in information systems and technology research. Since its inception, the model has been revised and adapted to fit a multitude of situations. Through subsequent research, Davis et al. (1989) proposed a simplified version of TAM with three constructs: behavioral intention, perceived usefulness, and perceived ease of use. The current study used a revised TAM with these TAM constructs with the addition of perceived enjoyment. Davis et al. (1992) found perceived enjoyment was significant in predicting an individual's technology usage. While perceived enjoyment is not always included in TAM, in virtual contexts, enjoyment is thought to play an important role in predicting users' intention to adopt IT applications in virtual environments (El-Said & Aziz, 2021).

Purpose/Research Questions

The purpose of this research was to explore post-secondary students' perspectives of virtual tours in an agricultural educational context. Specifically, this study sought to explore their perceptions of a virtual tour to learn about the cotton ginning process. This mixed methods study was guided by five research questions. Research question one sought to address the *quantitative data* that were collected and research questions two through five addressed the *qualitative findings*.

RQ1: How did participants assess the virtual tour's usefulness, enjoyment, ease of use, and intention for future use?
RQ2: What was the perceived educational merit of the virtual tour experience?
RQ3: What types of content and subject matter did participants enjoy most?
RQ4: How did participants describe the virtual tour's ease of use?
RQ5: What suggestions did participants provide regarding the development of virtual tours about agriculture and food science facilities?

Methods/Procedures

This study utilized the convergent parallel mixed methods approach. In this approach, quantitative and qualitative data are collected in a single study, either concurrently or sequentially, given a priority, analyzed separately, and then brought together for comparison and interpretation (Creswell & Plano Clark, 2011). The theoretical framework informed the study's research questions, the items included in the quantitative questionnaire, and the key questions asked during the focus group sessions. This allowed for similar quantitative data and qualitative findings to be related, compared, and discussed after data analysis. The target population for this study was undergraduate students at Texas Tech University in the Davis College of Agricultural Sciences and Natural Resources. The participants were a convenience sample of students who voluntarily chose to attend the focus group sessions (N = 32). The instrumentation for this study was an online Qualtrics questionnaire and a moderator guide to facilitate focus group discussions. The Qualtrics instrument contained 12 Likert-type scale statements to measure participants' perspectives about the virtual tour experience. It also had eight demographic questions and two questions regarding participants' connection to agriculture. The moderator

guide began with an introduction prompt for participants, five open-ended questions, and a final question that summarized the discussion and asked for additional comments. All participants were exposed to the same stimulus, an IVT of a cotton gin. This tour incorporated different multimedia aspects to walk viewers through the facility.

Quantitative data were originally collected in Qualtrics then exported into IBM SPSS v. 29. Descriptive statistics were run for participants' demographics, connection to agriculture, and the TAM scale items. Reliability for TAM constructs: perceived usefulness, perceived ease of use, perceived enjoyment, and intention to adopt, was established post hoc using Cronbach's alpha values. Qualitative data were collected by recording the focus group discussion into Otter ai. Each transcript was then verified for accuracy and personal identifiers were removed and replaced with participant numbers. Using DelveQDA, the data were analyzed using open, axial, and selective coding methods (Williams & Moser, 2019).

Most participants (*n* = 23, 71.9%) identified as female. All participants identified as Caucasian (*n* = 32), and two participants also identified as American Indian, Native American, or Alaska Native (*n* = 2, 6.3%). The majority (*n* = 20, 62.5%) were classified as seniors by credit hours. All participants were enrolled in the Davis College (*n* = 32, 100%), and agricultural communications was the most common major (*n* = 29, 90.6%). Half of the participants (n = 16, 50%) classified their hometown as a farm in a rural area. The rest of participants' hometown classifications were as follows: subdivision in a town or city (n = 7, 21.9%), urban or suburban area outside of the city limits (n = 5, 15.6%), and rural area, not a farm (n = 4, 12.5%). Regarding prior exposure, 16 participants (50%) selected that they had visited a cotton gin, and 15 participants selected they had not visited the site before. One participant selected "not sure."

Results

The first research question sought to describe how participants assessed the virtual tour's usefulness, enjoyment, ease of use, and intention for future use. Each TAM construct consisted of three Likert-type statements where 1 = *strongly disagree* and 5 = *strongly agree*. Table 1 reports the grand mean, standard deviation, and reliability coefficient for each TAM construct. The upper limit for each scale was 5.00 and each construct's grand mean was a 4.00 or greater.

Table 1.
Grand Means, Standard Deviations, and Cronbach's Alpha for TAM Constructs (N = 32)

Construct	Mean	Standard Deviation	Cronbach's α
Perceived Usefulness	4.57	.58	.67
Perceived Enjoyment	4.26	.70	.78
Perceived Ease of Use	4.40	.70	.78
Intention to Use	4.00	.70	.80

Note. 1 = s*trongly disagree*, 5 = *strongly agree*

Research Questions two through five sought to measure the qualitative insights gained through the focus group discussions. Table 2 summarizes the emergent themes for the research questions.

Themes were developed using open, axial, and selective coding methods, and are supported by participant statements (Williams & Moser, 2019).

Table 2.
Summary of Emergent Themes, Organized by Research Question with Representative Quotes from Participants

Research Question	Emergent Themes	Participant Quote
RQ2: What was the perceived educational merit of the virtual tour experience?	1. IVTs Have a Place Inside of the Classroom	"What I think is nice about it is it appeals to many different learning types because it appeals to your visual learners and it also will appeal to your auditory learners, but also your learners who learn by interacting."
	2. IVTs vs. Traditional Field Trips	"I feel like nothing can compare to in-person tours, but I feel like this did a really good job of making it realistic."
	3. Using IVTs in an Informal Setting	"It could be very useful tool in getting people information so they actually kind of know what's going on."
RQ3: What types of content and content matter did participants enjoy most?	1. Variety is Appreciated, but Videos are Elite	"The videos were my favorite part of the experience because they're short, they give you a whole lot of information really quick."
	2. Quick Facts are Best	"It's good that the information was pretty digestible. Especially for somebody who has no background in agriculture or a gin."
RQ4: How did participants describe the virtual tour's ease of use?	1. Multiple Ways to Navigate the Tour	"I wasn't ever confused because I clicked through the arrows, but if I would have just like clicked around then I might have gotten lost and not followed the correct path."
	2. "Go at Your Own Pace"	"I thought it was definitely helpful that you can go at your own pace and so stuff that interests you, you can learn more about."
	3. It's Easy!	"It was really easy to navigate and really easy to learn what each of the different processes did. It wasn't really confusing."
	4. Getting the Hang of It	"It definitely got easier to navigate once I got further in."
RQ5: What suggestions did	1. "Showcasing Any Process Within Agriculture"	"Virtual tours showcasing any process would be very, very beneficial to farmers to just show to anybody."

participants provide?	2. Improving Clarity	"I really liked the stops that were in between rooms that were like 'head to this part.' So, any place that you can put more of those, I think they were really helpful like directional signs at an airport."

Conclusions/Implications/Recommendations

Utilizing a convergent parallel mixed methods approach allowed the research team to collect and analyze the two complementary data sets separately, and then bring them together for comparison, discussion, and interpretation. The participants' grand means to the TAM items were all above the mid-point on the scale indicating overall positive responses to perceived usefulness, perceived enjoyment, perceived ease of use, and intention to adopt. These results were supported with the positive feedback from participants in the focus group discussions.

Although participants enjoyed the virtual tour experience, they did not view it as a substitute for on-site field trips. However, they did say these tours could be used as a supplement to those experiences and recognized it may allow some people to visit locations they might not otherwise have the opportunity to see. Previous researchers have noted the benefits virtual tours can provide to help students learn vicariously when on-site field trips are not possible (Han, 2020; Hosticka et al., 2002). Participants stated they enjoyed exploring the virtual tours because of the variety of content (i.e., photos, videos, text descriptions). They even recognized that this diversity in content can help students who have different learning preferences. This implies that virtual tours provide an engaging and enjoyable education experience for students, which is supported in prior research (Herritsch et al., 2013; Karcher & Reid, 2018).

As with any technology, it is vital users can navigate the system to find relevant information. TAM literature emphasizes the importance of perceived ease of use (Davis, 1985; Davis et al., 1992). Overall, participants said the virtual tour was each to use because they could navigate it at their own pace. Although some said they had to "get the hang of it" at first, they appreciate the multiple ways they could work through the tour. Their feedback implied they enjoyed having the autonomy to explore the site at their own pace and along their own path.

Participants indicated they would use an IVT to vicariously visit an FAS site again and had several recommendations for additional sites. They noted IVTs could be used to showcase "any process within agriculture," but the first suggestion was often an animal science facility such as a feedlot, processing plant, or dairy. Students had many suggestions for IVT improvement, all of which included clarifying and adding more structure.

This study's results provide context about the use of food and agricultural science IVTs in agricultural education. Future research should replicate this study with different IVTs and collect data from a larger, more diverse student population including those in secondary education. It is also recommended to collect feedback from the instructors who implement IVTs into their classroom and gather their students' perspectives of using IVTs as a learning tool. In terms of practice, IVT creators should use short videos (no longer than 90 seconds) as the main point of information and use photos and descriptions as a complement to the videos, rather than a

replacement. Additionally, future tours could add more structural components (more identification tags, directional items, etc.) to help emulate a real tour. IVTs should be created over animal science and crop and commodity facilities and processes, alongside various other FAS processes. Finally, instructors should use IVTs as an alternative to traditional field trips. Although IVTs may not be able to fully replace on-site field trips, there are many uses for them in and outside of the classroom.

References

Association for Experiential Education. (2023). *What is experiential education?* https://www.aee.org/what-is-experiential-education

Behrendt, M., & Franklin, T. (2014). A review of research on school field trips and their value in education. *International Journal of Environmental and Science Education*, *9*(3), 235–245. http://files.eric.ed.gov/fulltext/EJ1031445.pdf

Cassady, J. C., Kozlowski, A., & Kornmann, M. (2008). Electronic field trips as interactive learning events: Promoting student learning at a distance. *The Journal of Interactive Learning Research*, *19*(3), 439–454. https://www.learntechlib.org/p/24187/article_24187.pdf

Creswell, J. W., & Plano Clark, V. L. (2011). Choosing a mixed methods design. In *Designing and conducting mixed methods research* (pp. 53–106). essay, SAGE.

Davis, F. (1985). A technology acceptance model for empirically testing new end-user information systems: theory and results. *Ph. D. Dissertation, Massachusetts Institute Of Technology*. http://ci.nii.ac.jp/naid/20001062454

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, *22*(14), 1111–1132. https://doi.org/10.1111/j.1559-1816.1992.tb00945.x

De La Cruz, D. (2020, April 30). How to choose colleges with virtual tours. *The New York Times.* https://www.nytimes.com/2020/04/30/well/family/coronavirus-virtual-college-tours.html

El-Said, O., & Aziz, H. (2021). Virtual tours a means to an end: an analysis of virtual tours' role in tourism recovery post COVID-19. *Journal of Travel Research, 61*(3), 528–548. https://doi.org/10.1177/0047287521997567

Han, I. (2020). Immersive virtual field trips and elementary students' perceptions. *British Journal of Educational Technology*, *52*(1), 179–195. https://doi.org/10.1111/bjet.12946

Herritsch, A., Rahim, E., Fee, C. J., Morison, K. R., & Gostomski, P. A. (2013). An interactive virtual tour of a milk powder plant. *Chemical Engineering Education*, *47*(2), 107–114.

Hosticka, A., Schriver, M., Bedell, J. & Clark, K. (2002). Computer based virtual field trips. *Proceedings of ED-MEDIA 2002--World Conference on Educational Multimedia, Hypermedia & Telecommunications* (pp. 312-316). Association for the Advancement of Computing in Education (AACE). https://www.learntechlib.org/primary/p/9289

Institute of Museum and Library Services. (n.d.). *Facing challenge with resilience: How museums are responding during COVID-19.* https://www.imls.gov/blog/2020/04/facing-challenge-resilience-how-museums-are-responding-during-covid-19

Jackson, L. (2021). *Thinking outside of the (VR) box.* https://ttuagriculturist.com/2021/04/28/thinking-outside-of-the-vr-box/

Jones, D. (2020, March 18). 12 historic sites you can virtually tour from the couch during the coronavirus outbreak. *The Washington Post.* https://www.washingtonpost.com/travel/2020/03/18/these-historic-sites-attractions-are-offering-virtual-tours-during-coronavirus-pandemic/

Karcher, E. L., & Reid, P. (2018). The use of virtual farm tours in a dairy cattle management course. *NACTA Journal*, *62*(4), 371–375.

LaBreck, A. (2020, November 2). The rise of virtual reality tourism/digitization of culture in the time of COVID-19. *Harvard International Review*. https://hir.harvard.edu/the-rise-of-virtual-reality-tourism-digitization-of-culture-in-the-time-of-covid-19/

Marangunić, N., & Granić, A. (2014). Technology acceptance model: a literature review from 1986 to 2013. *Universal Access in the Information Society*, *14*(1), 81–95. https://doi.org/10.1007/s10209-014-0348-1

Mead, C., Buxner, S., Bruce, G., Taylor, W., Semken, S., & Anbar, A. D. (2019). Immersive, interactive virtual field trips promote science learning. *Journal of Geoscience Education*, *67*(2), 131–142. https://doi.org/10.1080/10899995.2019.1565285

National Pork Board (2019). *Pork Checkoff videos provide high-tech view of today's pig farming.* https://www.porkbusiness.com/news/hog-production/pork-checkoff-videos-provide-high-tech-view-todays-pig-farming

Williams, M., & Moser, T. (2019). The art of coding and thematic exploration in qualitative research. *International Management Review*, *15*(1), 45–72. https://www.proquest.com/scholarly-journals/art-coding-thematic-exploration-qualitative/docview/2210886420/se-2

A Case Study in Social Media Adoption: Agricultural Input Companies' Perceptions in Ecuador

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Introduction

Social media is a marketing tool that has grown rapidly in the last 10 years and has become a dynamic media of communication for businesses worldwide (Dahnil et al., 2014). The medium allows communicators to interact closely with customers and engage them in conversations or by creating new content (Yao et al., 2019). Therefore, companies have increased their presence on diverse social media platforms to reach their audience and supply their demand by assisting them through these online channels (Celimli & Adanacioglu, 2021). Social media, as a digital marketing tool, plays a role by providing companies with opportunities to expand into new markets due to consumers' increased use of digital technologies (Khiong, 2022). Moreover, the effects of COVID-19 on the global economy have also changed traditional marketing into new strategies utilizing online media as a tool to reach customers and increase sales (Herlina et al., 2022). As a result, different industries started adopting social media to influence purchasing and impact on performance with clients (Jamil et al., 2022).

The agricultural industry has been attached to traditional marketing strategies due to customers' preferences, but they are willing to adopt new ways of communication because of the new digital era we are living in (Doerfert et al., 2012). According to Butler (2022), agricultural companies are more likely to use social media accounts to communicate with clients instead of using their official website as an interaction tool. However, there is still a lack of information on using this social media in the agriculture industry regarding the benefit it provides (Goel & Jain., 2019). Social media marketing positively impacts companies' finances, and the use of these platforms is underdeveloped in Latin American countries compared to developed countries such as the United States (Mamgain et al., 2020). However, there is low adoption of digital marketing in Latin American companies creating a gap in understanding the performance of social media as a communication tool (Kolbe et al., 2022). According to Qalati et al. (2022), business owners in Latin America do not use social media because they are unsure of the benefits related to digital marketing, and only 10% of owners integrate this online media into their company's operations.

Ecuador, a Latin American country, defines social media as an information communications technology that offers tools to increase a company's profit and is helpful for market positioning by promoting a better quality in their services (Tenorio et al., 2019). Moreover, it is more commonly used in new businesses than those already in the market that prefer traditional communication strategies with their clients (Castro et al., 2021). Despite the knowledge of social media as a marketing tool, there is no information about adopting this online media in agricultural companies considering this industry a pillar of the Ecuadorian economy.The need for this study arises from the rapid growth of social media as a dynamic marketing tool worldwide. While various industries have embraced social media to expand into new markets and adapt to the digital age, the agricultural sector has remained relatively attached to traditional marketing strategies. Given the importance of agriculture as a pillar of the

Ecuadorian economy, understanding agricultural input companies' perceptions of adopting social media as a communication tool becomes important.

Theoretical Framework

For this research, the theoretical framework is based on the Technology, Organization, and Environment (TOE) Model. The TOE Model was selected because the study seeks to see how companies impact the adoption and execution of innovative technologies instead of focusing on individual decisions (David & Zuva, 2021). The model implies that the adoption is influenced by (1) **technology** and the available technology companies have, along with the applications and perceived relative advantage of it. **Organizational** (2), which is all related to the company's culture and properties. And (3) **environment**, relating to those factors that facilitate and inhibit its adoption in operations areas (Awa et al., 2015). Effendi et al. (2020), used the TOE Model to analyze the adoption of social media in small and medium enterprises by gathering managers' perceptions, and enough information on barriers to adoption.

Purpose/ Objectives

The purpose of this research is to explore agricultural input businesses' (fertilizers, pesticides, seed, and other inputs) perceptions of adopting social media as a communication tool with clients in Ecuador. These perceptions will help to understand their opinions, challenges, and opportunities about this form of communication. To accomplish this goal, three research questions were examined: (1) What are agricultural input businesses' opinions about the adoption of social media in Ecuadorian marketing? (2) What are the challenges? and (3) What opportunities exist in adopting social media in Ecuador's agricultural input companies?

Method

For this study, exploratory research was conducted using a one-case study design (Stake, 1995). The case was bounded by *place*, Ecuador, the type of business, where agricultural companies were selected, and finally, *participants' occupations*, which were selected professionals working in the companies' marketing department. A purposive sampling strategy was used to select marketing professionals willing to participate in the study, with a snowball sampling to reach out to a total of eight participants. The criteria for selecting the candidates were professionals currently working in the marketing department of an agricultural input company that was familiar with the marketing strategies implemented in the company. A total of eight marketing professionals participated in the study: three women and five men. For data collection, semi-structured interviews were conducted and recorded, where participants were asked about their perceptions of adopting social media as a marketing strategy for the company. For this primary data source, interviews were conducted virtually using Zoom, in the participant's native language, then translated to English. Of the eight marketing professionals interviewed for the study, the mean years of experience in agricultural marketing was 25 years.

Rigor was imbued into the study by setting in the qualitative standards of quality: confirmability, credibility, dependability, and transferability (Creswell & Creswell, 2018). Multiple data sources were used to improve this study's credibility, such as interviews, research memos, and social media analysis (Creswell & Creswell, 2018). Data were analyzed by

transcribing the interviews and using open and axial coding to get the themes for each one of the research questions.

Findings

Companies' Opinion

Three main themes related to agricultural input companies about social media as a communication tool: It is a good way for *customer closeness*, it is considered an *important tool* for communicating with clients, and they perceived it as *future communication*.

Regarding *customer closeness**, s***ocial media is a tool that allows companies to stay close to clients and facilitates communication with them by sharing updated information related to their products or services. Five of eight companies referred to this tool as a channel to achieve that closeness they could not have by only visiting clients in person. These platform interactions can help customers to solve their doubts faster. Company 2 stated: "I believe in that immediate closeness facilitated communication with clients to solve their needs."

According to *important tool, c*ompanies consider social media an important tool for sharing scientific information and a necessary platform to communicate with customers. Therefore, social media is essential for establishing new and effective communication strategies with clients. Company 5 suggested that social media might be implemented in every communication strategy, "I believe it is important and that it should be utilized gradually for establishing new strategies in marketing." Company 6 also stated that a planned social media posting could be good for clients' communication, "Easily you can plan your posts, make announcement appears, so I think it is a good way to utilize social media for communication."

However, with the future communication theme, online channels are becoming a frequent communication medium for new generations of clients. Participants consider themselves adapting their communication strategies digitally and be prepared for those young customers filling the agricultural market today. These tools were a good reason to migrate their traditional communication into a new way to share information using the internet. Company 6 agreed that it is still a lot to explore within online media, "the world is changing to a digital era, so it is a good reason to adapt to online communication"

Challenges

The challenges that agricultural input companies in Ecuador found are detailed in the following three main themes: *online media access, generational,* and *operational.*

The *online media access* theme was divided into two categories. The first one was *access to the internet*; meaning some rural areas still do not have good internet access, and farmers need to travel to the closest small town to use online media. Company 7 stated: "The main barrier that has complicated this strategy is the lack of internet, if you don't have downloaded the information, these tools become useless." On the other hand, *access to technology* is also part of the main theme. There are producers that do not have the latest phone technology, or they do not have social media apps because they do not know how to use them. Company 8 commented: "The most attractive segment does not use social media, they are not used to using these platforms, especially in the agricultural industry."

*Regarding generational**,*** age is the factor that is considered as another challenge in the adoption of social media communication. Most of the target audience of these companies are

people 45-50 years. This audience does not use many social media platforms and prefers using traditional channels (phone calls) to get new information about the agricultural industry. They represent 7% of the population using social media in the country and prefer using the Facebook platform for entertainment (Davalos, 2021). Company 1 stated: "The barrier is the client's age; I think it is something about their generation."

The last challenge theme was *operational*, such as content creation and posting. Companies need to share simple information that can be understandable for all audiences. Also, the lack of knowledge about the use of algorithms and how to effectively use these platforms make companies find agencies that can support them with this. Company 4 agreed: "Content creation, I believe, is one of the biggest challenges of companies, especially because they need to figure out if they can create by themselves or need to hire an external agent for that."

Opportunities

The opportunities social media offer to agricultural input companies are *reaching out to the audience*, *market positioning*, *merchandising*, and *cost-effectiveness*.

Reaching out to the audience theme is related to sharing online information that allows companies to reach out to their audience without traveling so far – this is also key to staying close to them. Clients can have the chance to search for products they need by contacting companies through these platforms. Company 1 stated: "With social media, you have a direct contact to reach out to potential clients."

Market positioning is an opportunity for companies to use social media platforms to work with their branding and become more known by posting valuable information on their accounts. It can make companies look more updated by using online communications and be recognized easily by their clients. Company 3 commented: "Social media can help us be in our end-user. Being in our producers' top of mind."

Merchandising opportunity theme is about how sales can be enhanced if social media is used as a tool to establish strategies to promote their services and offer them. Tools such as online payments, and price information can facilitate sales. Company 7 stated: "Sales of agricultural supplies can increase through online channels, especially when it is hard to reach the audience."

Finally**,** the *cost-effectiveness* theme can create communication strategies using social media tools with low or any implementation costs to facilitate solutions to clients and save time in traveling to their places. Company 6 stated: "Companies can save time and money to travel to the field and assess client's needs."

Conclusion/ Recommendations/ Implications

Social media is considered a tool for sharing information easily and keeping in touch regularly with customers in a digital era. Ecuadorian agricultural input companies' opinions are more focused on the communication area, rather than increasing sales. However, the challenges these businesses considered were related to internal issues and external factors that impact their adoption. These challenges are aligned with the TOE Model, where perceptions are influenced by inside business technology presence and environmental factors (Awa et al., 2015). Finally, the opportunities identified through the study were more in comparison with the number of

challenges. Agricultural input companies' opportunities can help them get a good reputation and become more known in the market, effectively impacting their sales. In the United States, social media adoption in companies is influenced by economic benefits and the lack of quality and availability of content (Ritz et al., 2019). Ritz et al. (2019), established a model in which these constructs were significantly related to social media adoption. In Ecuador, this opportunity and challenge were defined in the interviews as a cost-effective strategy and operational issues. Also, another outstanding opportunity in the US adoption of social media in business is that it is important to enhance brand awareness so that clients can recognize the business (Wang et al., 2016). This was another opportunity achieved in this study where companies agreed that social media is a way to get market positioning and gain more popularity.

This case study on agricultural input companies' perceptions of social media adoption in Ecuador revealed valuable insights for practice. To effectively leverage social media as a communication tool, companies should invest in digital literacy training for employees and target audiences to overcome challenges related to online media access and generational preferences. Creating valuable and understandable content tailored to the needs of farmers is essential, and utilizing social media analytics can help refine strategies based on audience insights. Partnering with influencers and integrating social media with traditional marketing efforts can expand reach and credibility. Offering online customer support, staying updated on social media trends, and collaborating with social media agencies are additional strategies for success.

This study can be replicated to in other countries and compare their perceptions with the ones identified in Ecuador. Also, this can be considered a database for the agricultural input industry to establish effective communication strategies in Ecuador. Future research can be conducted on other target audiences (producers) and analyze their perception of the use of social media to get agricultural information useful to solve their problems in the field. Other future research can be done to determine if there is a significant relationship between these constructs and social media adoption in agricultural input companies.

References

Awa, H. O., Ojiabo, O. U., & Emecheta, B. C. (2015). Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. *Journal of Science & Technology Policy Management*, 6(1), 76-94.

Butler, R. D. (2022). Exploring the Social Media Platforms and Online Communication Channels Utilized Among Agricultural Commodity Cooperatives in Texas (Doctoral dissertation).

Castro, C. R. M., Bourne, T. M. E., Véliz, R. A. M., & Ramírez, T. A. E. (2021). Importancia del marketing para el posicionamiento de los emprendimientos en Ecuador. *Revista publicando*, 8(31), 142-152.

Celimli, S., & Adanacioglu, H. (2021). Comparison of social media platforms in terms of marketing performances of food companies. *Italian Journal of Food Science*, 33(2), 54-62.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). *SAGE Publications, Inc*

Davila, N. (2021). En Ecuador, el 78,7% de los ciudadanos usa redes sociales. *Primicias*. https://www.primicias.ec/noticias/tecnologia/14-millones-ecuatorianos-usuarios-redes-sociales/#:~:text=En%20el%20pa%C3%ADs%2014%2C3,redes%20sociales%20en%20el%20pa%C3%ADs.

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Dahnil, M. I., Marzuki, K. M., Langgat, J., & Fabeil, N. F. (2014). Factors influencing SMEs adoption of social media marketing. *Procedia-social and behavioral sciences*, 148, 119-126.

David, J., & Zuva, T. (2021). A Review on TAM and TOE Framework Progression and How These Models Integrate. Advances in Science, *Technology and Engineering Systems Journal*, 6 (3), 137-145.

Doerfert, D. L., Graber, L., Meyers, C., & Irlbeck, E. (2012). Traditional and social media channels used by Texas agricultural producers. In American Association for Agricultural *Education Research Conference*. Asheville, NC.

Effendi, M. I., Sugandini, D., & Istanto, Y. (2020). Social media adoption in SMEs impacted by COVID-19: The TOE model. *The Journal of Asian Finance, Economics and Business*, 7(11), 915-925.

Goel, N., & Jain, D. (2019). The Challenges and Opportunities of Social Media for Business. JS *International Journal of Multidisciplinary Research*, 1(1).

Herlina, V., Yacob, S., Johannes, J., & Octavia, A. (2022). The Role of social media marketing in improving marketing performance for smes during the covid-19 pandemic: a literature review. *Put It Right Journal*, 1(1), 47-56.

Jamil, K., Dunnan, L., Gul, R. F., Shehzad, M. U., Gillani, S. H. M., & Awan, F. H. (2022). Role of social media marketing activities in influencing customer intentions: a perspective of a new emerging era. *Frontiers in Psychology*, 12, 6464.

Khiong, K. (2022). Impact and Challenges of Digital Marketing in Healthcare Industries during Digital Era and Covid-19 Pandemic. *Journal of Industrial Engineering & Management Research*, 3(5), 112-118.

Kolbe, D., Frasquet, M., & Calderon, H. (2022). The role of market orientation and innovation capability in export performance of small-and medium-sized enterprises: a Latin American perspective. Multinational Business Review, 30(2), 289-312.

Mamgain, A., Joshi, U., & Chauhan, J. (2020). Impact of Social Media in Enhancing Agriculture Extension. Retrieved from https://www.researchgate.net/publication/343999189

Qalati, S. A., Ostic, D., Sulaiman, M. A. B. A., Gopang, A. A., & Khan, A. (2022). Social media and SMEs' performance in developing countries: Effects of technological-organizational-environmental factors on the adoption of social media. *SAGE* Open, 12(2), 21582440221094594.

Ritz, W., Wolf, M., & McQuitty, S. (2019). Digital marketing adoption and success for small businesses: The application of the do-it-yourself and technology acceptance models. *Journal of Research in interactive Marketing*, 13(2), 179-203.

Stake, R. E. (1995). The art of case study research. SAGE Publications Inc.

Tenorio, G. E., Terranova, K. T. T., Villota, J. C., & Mayorga, L. S. (2019). El marketing digital en las empresas de Ecuador. *Journal of Science and Research: Revista Ciencia e Investigación*, 4(1), 1-10.

Yao, B., Shanoyan, A., Peterson, H. H., Boyer, C., & Baker, L. (2019). The use of new-media marketing in the green industry: Analysis of social media use and impact on sales. *Agribusiness*, 35(2), 281-297.

Attitudes of Secondary Agricultural Education Students Toward Agriculture and STEM

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Introduction/Theoretical Framework

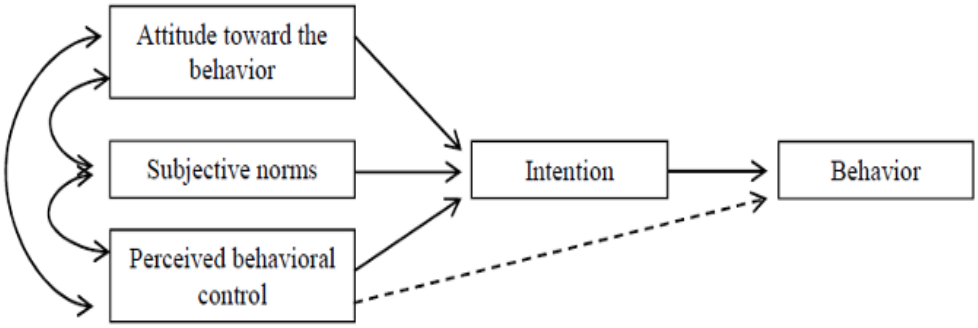
The term *STEM* has been widely used in educational vocabulary, often calling for greater understanding and push for the content, regarding not only careers but real-world application (Brown et al., 2011; Deming & Noray, 2019; Smith et al., 2015; Stubbs & Myers, 2016). The acronym STEM (i.e., Science, Technology, Engineering and Mathematics) has been foundational in the drive for an increased interest in specific content areas and their corresponding career fields (Brown et al., 2011). STEM connections have been introduced in core classrooms, in hope of expanding career opportunities for young adults and students (Brown et al., 2011; Smith et al., 2015; Stubbs & Myers, 2016). STEM is integrated in basic core learning, whether students are aware of its impact or not. Math courses, science courses and other electives use STEM learning and research in the curriculum and classroom setting (Stubbs & Myers, 2016). These connections are used in real life application settings with the intent to lead to careers and an education in science, technology, engineering, or mathematics (Smith et al., 2015; Stubbs & Myers, 2016).

STEM preparation in U.S. schools continues to drive the conversation with school administration and policy makers (Bostic et al., 2020; Kuenzi et al., 2006). Today's agricultural careers also require greater levels of STEM concepts and application (Stubbs & Myers, 2016). With agricultural education being described as the seamless avenue for applying and integrating STEM concepts (Smith et al., 2015), and with more programs nationwide moving toward STEM illuminating curriculum (McKim et al., 2018; Stubbs & Myers, 2016), do agricultural education students perceive the connection between STEM and agriculture? This study aimed to highlight attitudes of STEM, agriculture, and corresponding careers from the standpoint of school-based agricultural education (SBAE) students. A student's attitudes give insight to their perceptions, attitudes, and beliefs related to STEM in agriculture (Stubbs & Myers, 2016).

The theoretical underpinning for this study was based on Ajzen's (1991) theory of planned behavior, which "provides a useful conceptual framework for dealing with the complexities of human social behavior" (p. 206). The theory of planned behavior (see Figure 1) supports the notion of predictability regarding one's future plans and behaviors (Ajzen, 1991), which can be used to support the implementation of academic programs (i.e., STEM education) by highlighting individuals' attitudes and intentions towards the program (Murphrey et al., 2016). By exploring students' attitudes towards STEM and agriculture, possible links toward career intentions can be postulated (Knezek, 2011). A student's intentions or attitudes about the topic of STEM or agriculture creates a prediction for their behavior beyond high school (Norris, 2019).

Figure 1

Ajzen's (1991) Theory of Planned Behavior



Previous research related to post-secondary students' perceptions about agriculture revealed differing attitudes based on career pathway (Frick, 1995). Furthermore, the lack of STEM preparation heavily impacts a student's perception of a given topic area (Knezek, 2011). With an increased demand for STEM related careers (Smith et al., 2015; Swafford, 2018), this lack of preparation at the secondary level is resulting in unfilled jobs across a multitude of STEM careers (Knezek, 2011). This disinterest in STEM is being referred to as *STEM avoidance*, which leads to challenges related to student enrollment in secondary STEM courses (Knezek, 2011). STEM avoidance has carried over to educators and their efficacy levels of the content, which creates great concern when evaluating students' perception of STEM content (Knezek, 2011).

Additional research shows students anxiety levels toward STEM subjects impact STEM avoidance and lower STEM grades, regardless of the context (Daker et al., 2021; Knezek, 2011). Specifically, anxiety toward subjects such as math (Haynes et al., 2012; Parr et al., 2006) lead to students taking fewer STEM and math courses throughout their educational career at both secondary and post-secondary levels (Daker et al., 2021). Looking through the lens of SBAE, Wells et al. (2013) evaluated preservice agricultural education students' perceptions of enrolling in agricultural mechanics coursework based upon SBAE courses taken, finding prior experiences impacting students' desires and intentions to take additional related coursework. If conclusions were drawn for agricultural mechanics specifically, could the same be postulated for STEM courses? This issue can be linked to real world participation and outcomes (Daker et al., 2010).

Purposes and Objectives

The purpose of this study was to determine attitudes and perceptions of SBAE students toward agriculture, STEM education, and careers in one, or both, of the respective fields. Three research objectives guided this study: (1) Identify agricultural education students' attitudes toward agriculture and STEM; (2) Identify agricultural education students' attitudes toward careers in STEM, and (3) Identify agricultural education students' attitudes toward careers in agriculture.

Methods and Procedures

Attitudes for this exploratory, non-experimental survey research study were measured using semantic differential scales (Osgood et al., 1965). The instrument selected for this study was modified from a study conducted by Knezek and Christensen (2008) because of its validity, reliability, and specific design to measure youths' attitudes of STEM. Semantic differentials are utilized to quantitatively measure attitudes using dichotomous terms separated by a seven-point scale (Osgood et al., 1965). To measure each factor, five pairs of dichotomous terms were used in a randomized order. The dichotomous pairs used were, *Mundane to Fascinating, Unappealing to Appealing, Unexciting to Exciting, Means Nothing to Means a Lot,* and *Boring to Interesting*. The factors for which these dichotomous pairs were placed for this study were, *Agriculture is…, Science is…, Technology is…, Engineering is…, Mathematics is…, A Career in STEM is…,* and *A Career in Agriculture is…* Seven response choices were provided for each dichotomous pair with one used to indicate the most negative attitude and seven used to indicate the most positive attitude. The semantic items were then randomized for the remaining stems.

In addition to the seven factors, four demographic questions (i.e., sex, age, grade level, and years enrolled in an agricultural education course) were collected to describe students who participated in the study. Participants were from a rural, public, secondary school in Oklahoma that was a two-teacher program serving 110 students. Participants were primarily male (55%), ranged in age from 13 to 18, and were enrolled in eight through twelfth grade. The instrument was created in Qualtrics and administered using a QR code to all 110 SBAE students at the school, of which 72.7% responded. After data collections, SPSS version 28 was used to recode the semantic scales (as needed) to position the positive attitude at a 7 on the semantic scale (Field, 2018) and conduct the descriptive statistical analysis. This allowed for grand means to be calculated for each factor, where a grand mean ranging from 1.00 to 3.99 indicated a negative attitude, 4.00 indicated a neutral attitude, and 4.01 to 7.00 indicated a positive attitude for the factor.

Findings

The mean for the factor Agriculture was 5.78 (*SD* = 1.12), indicating a positive attitude. Technology was the next highest factor with a mean of 5.24 (*SD* = 1.18), followed by engineering with 4.83 (*SD* = 1.53), and science with 4.35 (*SD* = 1.42), all of which were also considered positive. Math was the lowest rated factor with a mean of 3.53 (*SD* = 1.77), resulting in a negative perception. To further understand the means for each factor, Table 1 outlines the semantic scale for each along with the mode and percentage of respondents selecting the mode.

Table 1

SBAE Student Agriculture and STEM Semantic Ratings (n = 80)

Item Stem	Semantic Scale	Mode	%[a]
Science is . . .	Mundane to Fascinating	4	30.0
	Unappealing to Appealing	4	33.8
	Unexciting to Exciting	4	33.8
	Means Nothing to Means A Lot	7	32.5
	Boring to Interesting	5	27.5

Math is . . .	Boring to Interesting	1	50.0
	Unappealing to Appealing	1	42.5
	Mundane to Fascinating	1	43.8
	Unexciting to Exciting	1	32.5
	Means Nothing to Means A Lot	1	30.0
Engineering is . . .	Unappealing to Appealing	7	32.5
	Mundane to Fascinating	7	35.0
	Means Nothing to Means A Lot	5	32.5
	Unexciting to Exciting	7	36.3
	Boring to Interesting	5	35.0
Technology is . . .	Unappealing to Appealing	7	46.3
	Means Nothing to Means A Lot	7	36.3
	Boring to Interesting	7	36.3
	Unexciting to Exciting	5	38.8
	Mundane to Fascinating	7	38.8
Agriculture is . . .	Mundane to Fascinating	7	55.0
	Unappealing to Appealing	7	52.5
	Unexciting to Exciting	7	56.3
	Means Nothing to Means A Lot	7	67.5
	Boring to Interesting	7	52.5

Note. Scale of 1 to 7. [a]The percentage corresponds to the participants selecting the mode.

Four of the semantic ranges related to science resulted in a modal response of neutral, although science was deemed to be *interesting* (mode of 5) and *mean a lot* (mode of 7) to participants. Math on the other hand was considered *boring*, *unappealing*, *mundane*, *unexciting*, and *meaning nothing* according to modal responses. Engineering was reported to be *appealing*, *fascinating*, and *exciting* (mode of 7), while also leaning toward *interesting* and *means a lot* (Mode of 5). Similarly, technology resulted in attitudes of *appealing*, *means a lot*, *interesting*, and *fascinating*. Agriculture, which resulted in the highest overall perception, was considered *fascinating*, *appealing*, *exciting*, *means a lot*, and *interesting* when considering the modal responses.

Utilizing the same semantic differential scale, participants indicated a positive attitude about a career in STEM (m = 4.19; SD = 1.51). To further understand the semantic scale for the participants perceptions, Table 2 displays the mode and percentage of participants selecting the mode for each of the five scale items for this factor. Therefore, a career in STEM was perceived as neutral (modal response of 4) for four of the five semantic scales, while it was considered to be closer to fascinating (modal response of 5) for the fifth scale.

Table 2

SBAE Student Career in STEM Semantic Rating (n = 80)

Item Stem	Semantic Scale	Mode	%[a]
A Career in STEM is . . .	Means Nothing to Means A Lot	4	32.5
	Boring to Interesting	4	30.0
	Mundane to Fascinating	5	36.3
	Unappealing to Appealing	4	37.5
	Unexciting to Exciting	4	46.3

Note. Scale of 1 to 7. [a]The percentage corresponds to the participants selecting the mode.

The mean for students' attitude toward a career in agriculture indicated a positive perception (*m* = 5.43; *SD* = 1.22). The five semantic scale items and the corresponding mode and percentage of students selecting the mode is displayed in Table 3.

Table 3

SBAE Student Career in Agriculture Semantic Rating (n = 80)

Item Stem	Semantic Scale	Mode	%[a]
A Career in Agriculture is . . .	Unexciting to Exciting	7	50.0
	Unappealing to Appealing	7	48.8
	Mundane to Fascinating	7	43.8
	Means Nothing to Means A Lot	7	53.8
	Boring to Interesting	4	46.3

Note. Scale of 1 to 7. [a]The percentage corresponds to the participants selecting the mode.

Conclusions/Recommendations/Implications

Based on results of this study, we conclude students have positive perceptions about science, technology, engineering, and agriculture. Math was the only factor found to have a negative connotation. Positive perceptions about careers related to STEM and agriculture were also found. Among these factors, students had the most positive attitude toward agriculture, followed by technology, engineering, science, and math. Considering participants were enrolled in an SBAE class at the time data were collected, positive attitudes toward agriculture are not surprising. Although these grand means ranged between negative (mean less than 4.00) and positive (mean of 4.01 to 7.00), the majority fell in the lower quartile of the positive range. Perhaps additional emphasis on STEM in the context of agriculture would further students' perceptions of these factors, which aligns with SBAE programs providing individuals with the context in which to apply real-world knowledge and skill acquisition (Barrick, 1989; Hillison, 1986; Moore, 1988).

Considering the overall attitudes, conclusions can be drawn related to the future intentions and behaviors of the participants based on their attitudes (Ajzen, 1991). As the theory of planned behavior supports the notion of predictability regarding one's future plans and behaviors (Ajzen, 1991), therefore, it can be concluded that the potential exists for the participants to explore a career in agriculture based on their current intentions. Although the theory can also be used to support the implementation of academic programs such as STEM (Murphrey et al., 2016), the

current attitudes held make it difficult to predict their intentions toward STEM in the future, but conclusions related to agriculture and its related careers can be postulated (Knezek, 2011).

Moving forward, comparative studies should be conducted to further link agricultural and STEM attitudes. Specifically, this study should be replicated with students not enrolled in SBAE courses at a variety of schools, helping to answer the question – do students perceive agriculture to be a STEM discipline? Additionally, the attitudes of teachers should be considered to determine if they possess the knowledge and skills necessary to illuminate STEM in the context of specific agricultural career pathways while also helping to inform SBAE teacher preparation programs. Considering practice, as an SBAE teacher it is essential to consider students perceptions of STEM in agriculture and how their knowledge and perception can be fostered and improved for 21st century careers.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-t

Barrick, R. K. (1989). Agricultural education: Building upon our roots. *Journal of Agricultural Education*, *30*(4), 24-29. https://doi.org/10.5032/jae.1989.04024

Bostic, J. D., Clark, Q. M., Vo, T., Esters, L. T., & Knobloch, N. A. (2020). A design process for developing agricultural life-science focused model electing activities. *School Science and Mathematics, 2020*(00), 1-12. https://doi.org/10.1111/ssm.12444

Brown, R., Brown, J., Reardon, K, & Merrill, C. (2011). Understanding STEM: Current perceptions. *Technology and Engineering Teacher*, *70*(6), 5. https://www.researchgate.net/publication/234659554_Understanding_STEM_Current_perceptions

Daker, R.J., Gattas, S.U., Sokolowski, H.M., Green, A. E., & Lyons, I. M. (2021). First-year students' math anxiety predicts STEM avoidance and underperformance throughout university, independently of math ability. *npj Science of Learning*, 6(17). https://doi.org/10.1038/s41539-021-00095-7

Deming, D. J., & Noray, K. L. (2019). STEM careers and the changing requirements of work. *UpToDate.* Retrieved December 1, 2022, from http://www.nber.org/papers/w25065

Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics (5th ed.)*. SAGE.

Frick, M. J., Birkenholz, R. J., Gardner, H., & Machtmes, K. (1995). Rural and urban inner-city high school student knowledge and perception of agriculture. *Journal of Agricultural Education, 36*(4), 1-9. https://doi.org/10.5032/jae.1995.04001

Haynes, J. C., Robinson, J. S., Edwards, M. C., & Key, J. P. (2012). Assessing the effect of using a science-enhanced curriculum to improve agriculture students' science scores: A causal

comparative study. *Journal of Agricultural Education, 53*(2), 15-27. https://doi.org/10.5032/jae.2012.02015

Hillison, J. (1996). The origins of agriscience: or where did all that scientific agriculture come from? *Journal of Agricultural Education, 37*(4), 8–13. https://doi.org/10.5032/jae.1996.04008

Knezek, G., Christensen, R., & Tyler-Wood, T. (2011). Contrasts in teacher and student perceptions of STEM content and careers. *Contemporary Issues in Technology and Teacher Education, 11*(1), 92-117. https://www.learntechlib.org/primary/p/35400/

Knezek, G., & Christensen, R. R. (2008). The importance of information technology attitudes and competencies in primary and secondary education. In J. Voogt & G. Knezek (Eds.), International Handbook of Information Technology in Primary and Secondary Education (pp. 321-331). Springer.

Kuenzi, J. J., Matthews, C. M., & Mangan, B. F. (2006*). Science, technology, engineering, and mathematics (STEM) education issues and legislative options*. Congressional Research Report. Congressional Research Service. https://apps.dtic.mil/dtic/tr/fulltext/u2/a474889.pdf

McKim, A. J., Velez, J. J. & Sorensen, T. J. (2018). A national analysis of school-based agricultural involvement, graduation, STEM achievement, and income. *Journal of Agricultural Education, 59*(1), 70-85. https://doi.org/10.5032/jae.2018.01070

Moore, G. E. (1988). The involvement of experiment stations in secondary agricultural education, 1887-1917. *Agricultural History, 62*(2), 164-176. https://jstor.org/stable/3743291

Murphrey, T. P., Lane, K., Harlin, J., & Cherry, A. L. (2016). An examination of pre-service agricultural science teachers' interest and participation in international experiences: Motivations and barriers. *Journal of Agricultural Education, 57*(1), 12-29. https://doi.org/10.5032/jae.2016.01012

Norris, S. L., Murphrey, T. P., & Leggette, H. R. (2019). Do they believe they can communicate? Assessing college students' perceived ability to communicate about agricultural sciences. *Journal of Agricultural Education, 60*(4), 53-70. doi: 10.5032/jae.2019.04053

Osgood, C. E., Suci, G. J., & Tannebaum, P. H. (1965). *The measurement of meaning*. University of Illinois Press.

Parr, B. A., Edwards, M. C., & Leising, J. G. (2006). Effects of a math-enhanced curriculum and instructional approach on the mathematics achievement of agricultural power and technology students: An experimental study. *Journal of Agricultural Education, 47*(3), 81-93. https://doi.org/10.5032/jae.2006.03081

Smith, K. L., Rayfield, J., & McKim, B. R. (2015). Effective practices in STEM integration: Describing teacher perceptions and instructional method use. *Journal of Agricultural Education, 56*(4), 182-201. https://doi.org/10.5032/jae.2015.04183

Stubbs, E., & Myers, B. (2016). Part of what we do: Teacher perceptions of STEM integration. *Journal of Agricultural Education, 57*(3), 87-100. https://doi.org/10.5032/jae.2016.0308

Swafford, M. (2018). The state of the profession: STEM in agricultural education. *Journal of Agricultural Education, 59*(4), 315-333. https://doi.org/10.5032/jae.2018.04315

Wells, T., Perry, D. K., Anderson, R. G., Shultz, M. J., & Paulsen, T. H. (2013). Does prior experience in secondary agricultural mechanics affect pre-service agricultural education teachers' intentions to enroll in post-secondary agricultural mechanics coursework? *Journal of Agricultural Education, 54*(4), 222-237. https://doi.org/10.5032/jae.2013.04222

Identifying Teacher's Perceived Tools and Equipment Availability to Teach Welding Before and After a Professional Development Workshop

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Introduction/Framework

A noticeable lack of appropriate training paired with the scarcity of consumable materials has had a severe impact on instructors, and ultimately the learning process for their students (Darling-Hammond, 2000; Darling-Hammond, 2007). It is important to create a learning environment with tools and equipment inclusive to the various agricultural industries. The quality, as well as variety, of tools and equipment maintained in the classroom by School Based Agricultural Education (SBAE) teachers affects the ability of the teachers to meet curricular and industry standards. (McCubbins et al., 2016). In addition to reported ill-equipped agricultural mechanics laboratories (McCubbins et al. 2016), there is a concern that if tools and equipment are available, SBAE teacher are not properly trained to use these resources (McCubbins et al. 2017). Previous research found that there could be a connection between what subject matter agricultural mechanics SBAE teachers perceived as important to teach and their perceived tool and equipment availability (McCubbins et al. 2016; Shultz et al., 2014). Furthermore, a nationwide study conducted by Wells and Hainline (2021) found SBAE teacher professional development need for additional training in agricultural mechanics focused on areas in the welding industry (i.e. American Welding Society standards for welding procedures, metallurgy, structural welding, and Gas Tungsten Arc Welding). SBAE teachers need to have access to necessary resources and the knowledge to operate various tools and equipment in their programs.

The theory that guides this study is the Social Cognitive Theory (SCT). SCT is comprised of behavioral, personal and environmental factors (Bandura, 1986). This study looks at the differences in how the environmental factors are perceived before and after a welding workshop. McCubbins et al. (2016) speculated that the lack of perceived tools and equipment to teach agricultural mechanics could be linked to a teacher's lack of self-efficacy in teaching specific agricultural mechanics competences. One of the factors that comprises SCT is the environment. Environmental factors are influenced by personal and behavioral factors (Bandura, 1989). Also, individuals select activities aligned with their personal comfortabilities (Emmons & Diener, 1986). Therefore, the tools and equipment available to SBAE teachers can immensely affect the outcome of their quality of instruction, coursework, and laboratory management (McKim & Saucier, 2013). An instructor in a welding course may not teach a subject if they feel they do not have the proper tools and equipment. Concurrently, a teacher who is not competent to teach agricultural mechanics may not prioritize purchasing tools (Saucier, et al., 2014). Due to the bidirectional nature of SCT, personal factors impact the perceived environment (Bandura, 1989). Self-efficacy is shown to be a piece of personal factors in the model of SCT. (Bandura, 1989). As Bates and Bray-Clark (2003) outlined, professional development workshops for teachers should prioritize an instructor's self-efficacy to improve overall instruction for students. A teacher's self-efficacy is measured by the belief that the individual can perform (Bandura, 1997). Availability to tools and equipment to teach agricultural mechanics is directly related to a

teacher's perceived competency (McCubbins et al., 2017). Whereas teacher competency and availability of resources are related (McCubbins et al., 2017), there is a gap in literature that shows how a teacher's perceived environment may change before and after a workshop.

Purpose and Objectives

The purpose of this study was to identify SBAE teachers' perceived availability of tools and equipment to teach welding prior to and after attending, a ten-day intensive professional development workshop. The purpose of this study is fulfilled by the following objectives: (1) Describe teachers' perceived tool and equipment availability to teach welding prior to the professional development workshop. (2) Describe teachers' perceived tool and equipment availability to teach welding after the professional development workshop. The purpose and objectives of this study aligned with the National Research Agenda (NRA) of the American Association for Agricultural Education (AAAE). Roberts, et al. (2016) suggested that advances within industry have helped to drive and dictate the need for skilled and knowledgeable educational professionals who are capable of adequately utilizing available resources and experience to reach and teach the future members of the industrial workforce.

Methods

Participants for this study included SBAE instructors completing a ten-day intensive Agricultural Mechanics Academy (AMA) in 2020 and 2021. The AMA workshop aimed to provide educators with the opportunity to improve and enhance their skills with regards to welding basics, SMAW, GMAW, GTAW, FCAW, O-A, and plasma cutting. Researchers determined a pre-test versus post-test would be effective at determining the impact of an educational in-service training. Following a review of literature, a paper questionnaire was developed and reviewed by a panel of experts (N = 5; with school-based agricultural education experience and N = 5; with industry training experience) and was subsequently revised. In order to determine the reliability of the instrument, a post-hoc reliability analysis was conducted from the pre-test instrument (N = 20). An *ex post facto* reliability analysis was conducted in year one. Based on recommendations by George & Mallery (2003, p. 231), all Cronbach's α subscales were deemed *excellent* (α =0.936-0.992) for reliability. Respondents who attended the AMA were asked to rate the tools and equipment available to perform 52 competencies from seven constructs. The seven constructs are *Welding Basics, Shielded Metal Arc Welding, Gas Metal Arc Welding, Gas Tungsten Arc Welding, Flux Cored Arc Welding, Oxy-Acetylene Cutting & Welding,* and *Plasma Cutting*.

Results

This study recorded data from forty participants over two workshops. Just over half of the participants that attended the workshops were female (f = 52.5%). The majority of the participants earned their teaching certification traditionally through a university-based certification program (f = 60.0%). Practically all participants taught in the agricultural education program area (f = 97.5%). The majority of participants have zero years of experience in the welding industry (f = 75%). The average years of experience teaching welding from this study was (f = 1.48). Data from the pre-test indicated the *Welding Basics* construct had the highest

grand mean construct score of 2.58; SD = 0.79, while the *Flux Cored Arc Welding* construct had the lowest grand mean construct score of 1.61; SD = 0.76. Data from the post-test identified the construct of *Shielded Metal Arc Welding* having the highest grand mean score of 3.81; *SD* = 0.88 and the construct of *Gas Tungsten Arc Welding* as having the lowest grand mean score of 2.78; *SD* = 1.31. The *Flux Cored Arc Welding* construct had the greatest change in mean difference scores of 1.63, and the *Plasma Cutting* construct has the smallest change in mean difference scores of 0.49 as shown below in Table 1.

Table 1
Grand Mean Construct Scores for the Tools and Equipment Available to Teach Welding Pre and Post Workshop

Construct	Pre (*n* = 40)		Post (*n* = 39)		*MD*
	M	*SD*	*M*	*SD*	
1. Welding Basics	2.58	0.79	3.66	0.70	1.08
2. Shielded Metal Arc Welding	2.45	0.76	3.81	0.88	1.36
3. Gas Metal Arc Welding	2.48	0.82	3.63	0.97	1.15
4. Gas Tungsten Arc Welding	1.72	0.83	2.78	1.31	1.06
5. Flux Cored Arc Welding	1.61	0.76	3.24	1.05	1.63
6. Oxy-Acetylene Cutting & Welding	2.17	0.95	3.58	1.15	1.41
7. Plasma Cutting	2.33	1.01	2.82	1.37	0.49

Note. 1 = None/Very Poor; 2 = Little; 3 = Good; 4 = Above Average; 5 = Excellent.

Table 2 shows the individual item mean scores and differences within each construct. Every item showed a positive change between pre and post workshop surveys. In the *Welding Basics* construct, the Welding Theories item reported the highest mean difference (*MD* = 1.14). Whereas the Welding Tools item reported the lowest mean difference (*MD* = 0.81). In the *SMAW* construct, the Non-Destructive Weld Testing item saw reported the highest mean difference (*MD* = 1.41). Whereas the Destructive Weld Testing item reported the lowest median deviation (*MD* = 0.95). In the In the *GMAW-MIG* construct, the Non-Destructive Weld Testing item reported the highest mean difference (*MD* = 1.31). The GMAW Equipment and Supplies item reported the lowest mean difference (*MD* = 1.02). In the *GTAW-TIG* construct, the Non-Destructive Testing item reported the highest mean difference (*MD* = 1.31). The GTAW Equipment Adjustment item reported the lowest mean difference (*MD* = 0.82). In the *FCAW* construct, the FCAW Weld Visual Inspection item reported the highest mean difference (*MD* = 1.53). The Destructive Testing item reported the lowest mean difference (*MD* = 1.14). In the *Oxy-Acetylene* construct, the Troubleshooting Oxy-Acetylene Problems item reported the highest mean difference (*MD* = 1.28). The Oxy-Acetylene Equipment and Supplies construct reported the lowest mean difference (*MD* = 1.16). Finally, in the *Plasma Cutting* construct, three items reported the highest mean difference (*MD* = 0.36). The Plasma Cutting Equipment and Supplies item reported the lowest mean difference (*MD* = 0.19).

Table 2
Individual Item Analysis of Tools and Equipment Available to Teach Welding Pre and Post Workshop (N=39)

Construct	Pre (*N = 40*)		Post (*N = 39*)				
	M	*SD*	*M*	*SD*	*t*	*df*	*P*

Welding Basics							
Welding Safety	3.03	1.000	3.82	0.942	-4.323	38	0.000
Welding tools	2.88	0.992	3.69	0.800	-4.494	38	0.000
Math for welding	2.38	1.005	3.33	0.955	-5.512	38	0.000
Welding Theories	2.40	1.033	3.54	0.756	-7.883	38	0.000
Weld Joints and positions	2.63	1.079	3.64	0.843	-6.087	38	0.000
Welding Processes	2.60	1.008	3.61	0.823	-6.174	37	0.000
Welding Techniques	2.60	0.982	3.54	0.790	-6.625	38	0.000
Metallurgy & Metal Work	2.25	1.032	3.36	0.843	-8.081	38	0.000
Shielded Metal Arc Welding (SMAW)							
SMAW Equipment and Supplies	2.65	1.001	3.67	0.898	-5.94	38	0.000
Welding Equipment Set-Up	2.63	1.079	3.67	0.898	-5.888	38	0.000
SMAW Electrodes	2.60	1.033	3.67	0.898	-6.252	38	0.000
SMAW Welding Positions	2.53	1.012	3.64	0.903	-6.429	38	0.000
Troubleshooting Welding Problems	2.45	0.986	3.54	0.913	-6.339	38	0.000
Weld Visual Inspection	2.55	0.986	3.69	0.950	-6.12	38	0.000
Destructive Weld Testing	2.20	0.992	3.15	1.089	-4.432	38	0.000
Non-Destructive Weld Testing	2.28	0.987	3.69	0.950	-7.721	38	0.000
Gas Metal Arc Welding (GMAW-MIG)							
GMAW Equipment and Supplies	2.60	1.033	3.62	0.935	-6.087	38	0.000
Welding Equipment Set-Up	2.60	1.033	3.67	0.982	-6.252	38	0.000
GMAW Equipment Adjustment	2.55	1.037	3.64	0.959	-6.493	38	0.000
GMAW Welding Positions	2.58	1.035	3.64	0.959	-6.252	38	0.000
Troubleshooting Welding Problems	2.45	1.011	3.59	0.938	-7.203	38	0.000
Weld Visual Inspection	2.50	1.013	3.64	0.959	-7.203	38	0.000
Destructive Weld Testing	2.18	1.059	3.08	1.133	-4.141	38	0.000
Non-Destructive Weld Testing	2.23	1.050	3.54	0.942	-7.243	38	0.000
Gas Tungsten Arc Welding (GTAW- TIG)							
GTAW Equipment and Supplies	1.90	1.008	2.76	1.218	-4.765	37	0.000
Welding Equipment Set-Up	1.90	1.008	2.74	1.178	-4.683	37	0.000
GTAW Equipment Adjustment	1.88	1.017	2.70	1.175	-5.013	36	0.000
GTAW Welding Positions	1.90	1.008	2.74	1.178	-4.589	37	0.000
Troubleshooting Welding Problems	1.83	1.010	2.74	1.178	-5.362	37	0.000
Weld Visual Inspection	1.80	0.992	2.74	1.178	-5.569	37	0.000
Destructive Weld Testing	1.73	0.987	2.59	1.208	-4.471	38	0.000
Non-Destructive Weld Testing	1.73	0.987	2.70	1.175	-5.538	36	0.000
Flux Cored Arc Welding (FCAW)							
FCAW Equipment and Supplies	1.73	0.877	3.16	1.079	-7.751	37	0.000
Welding Equipment Set-Up	1.73	0.877	3.21	1.056	-8.465	38	0.000
FCAW Equipment Assembly and Adjustment	1.73	0.877	3.21	1.056	-8.465	38	0.000
FCAW Welding Positions	1.78	0.920	3.23	1.063	-7.982	38	0.000
Troubleshooting Welding Problems	1.75	0.899	3.21	1.056	-8.324	38	0.000

Weld Visual Inspection	1.73	0.877	3.26	1.093	-8.238	38	0.000
Destructive Weld Testing	1.73	0.877	2.87	1.056	-6.097	38	0.000
Non-Destructive Weld Testing	1.73	0.877	3.21	1.080	-7.81	38	0.000
Oxyacetylene							
Oxyacetylene Equipment and Supplies	2.33	1.071	3.46	1.047	-6.12	38	0.000
Oxyacetylene Equipment Setup	2.28	1.086	3.46	1.047	-6.194	38	0.000
Oxyacetylene Equipment Assembly and Adjustment	2.25	1.080	3.44	1.021	-6.194	38	0.000
Oxyacetylene welding	2.05	1.037	3.21	1.174	-5.269	38	0.000
Oxyacetylene cutting	2.25	1.056	3.46	1.047	-6.412	38	0.000
Troubleshooting Oxyacetylene Problems	2.13	1.067	3.41	1.019	-6.723	38	0.000
Plasma Cutting							
Plasma Cutting Equipment and Supplies	2.35	1.145	2.56	1.314	-1.091	38	0.282
Plasma Cutting Equipment Setup	2.33	1.163	2.59	1.292	-1.404	38	0.168
Plasma Cutting Equipment Assembly and Adjustment	2.33	1.163	2.59	1.292	-1.404	38	0.168
Plasma Hand Cutting	2.33	1.163	2.59	1.292	-1.464	38	0.151
Plasma CNC Cutting	2.38	1.295	2.61	1.306	-1.508	37	0.140
Troubleshooting Plasma Cutting Problems	2.25	1.171	2.58	1.287	-1.69	37	0.099

Note. 1 = None/ Very Poor, 2 = Little, 3 = Good, 4 = Above Average, 5 = Excellent

Conclusions and Discussion

Participants that completed the AMA reported a change in the availability of tools and equipment available to teach welding despite not purchasing any tools and equipment or receiving any tools or equipment as a part of the AMA. Flux Core Arc Welding saw the largest mean change, whereas Plasma Cutting saw the smallest. It is interesting to note that the Plasma Cutting construct changed despite not formally teaching that construct in the AMA. This may be a result of the level of confidence that grew through the training they received in the other welding areas. Specifically, Oxy-Acetylene Equipment Set-Up saw a large mean difference increase, which should be noted because of the extremely volatile nature of incorrect usage of this equipment. This suggests that the training that they received during the AMA better prepared them to use the tools and equipment that they already possessed. Thus, an increase of their self-efficacy and knowledge in the welding skill area, altered their perceived environment. This observation aligns with SCT, linking personal and environmental factors (Bandura, 1989).

The results of this workshop suggest that many agricultural mechanics educators are not utilizing their equipment and tools to their full extend due to lack of skilled knowledge. This adds to McCubbins et al. (2017) that showed a relationship between teacher competence and availability of tools and equipment. In order to improve teacher knowledge and self-efficacy in welding tools and equipment, more professional development opportunities should be included in per service and in-service teachers, as this aligns with the professional development needs of SBAE teacher nationwide (Wells & Hainline, 2021). Additionally, we recommend the creation and distribution of curriculum on proper tool and equipment usage. It is recommended that

teacher educators and industry also create supporting educational materials for SBAE programs. These findings also connect to McCubbins et al.'s (2016) speculation that perceived importance and perceived tool availability may be linked. It is recommended that future research can investigates perceived knowledge of tools and equipment and their availability in an SBAE program.

References

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology*, *4*(3), 359-373. https://doi.org/10.1521/jscp.1986.4.3.359

Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Annals of child development. Vol.6. Six theories of child development* (pp.1-60). JAI Press.

Bandura, A. (1991). Social cognitive theory of self-regulation. *Organizational Behavior and Human Decision Processes*, *50*(2), 248–287. https://doi.org/10.1016/0749-5978(91)90022-l

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bates, R., & Bray-Clark, N. (2003). Self-efficacy beliefs and teacher effectiveness: Implications for professional development. *Professional Educator*, *26*(1), 13-22.

Emmons, R. A., & Diener, E. (1986). Situation selection as a moderator of response consistency and stability. *Journal of Personality and Social Psychology, 51*(5), 1013–1019. https://doi.org/10.1037/0022-3514.51.5.1013

Darling-Hammond, L., & Snyder, S. (2000). Teaching and teacher education. *Authentic assessment of teaching in context, 16*(5-6), 523-545. https://doi.org/10.1016/S0742-051X(00)00015-9

Darling-Hammond, L., & Baratz-Snowden, J. (2007). A good teacher in every classroom: Preparing the highly qualified teachers our children deserve. *Educational Horizons*, *85*(2), 111–132.

George, D., & Mallery, P. (2003). *Using SPSS for Windows Step by Step: A Simple Guide and Reference* (4th ed.). London: Pearson Education.

Hutchins, E. (1993). Learning in Doing: Social, Cognitive, and Computational Perspectives. In S. Chaiklin & J. Lave (Eds.), *Understanding Practice: Perspectives on Activity and Context* (Learning in Doing: Social, Cognitive and Computational Perspectives, p. 415). Cambridge University Press. https://doi.org/10.1017/CBO9780511625510.016

McKim, B. R., & Saucier, P. R. (2013). A 20-Year Comparison of Teachers' Agricultural Mechanics Laboratory Management Competency. *Journal of Agricultural Education,* 54(1), 153-166. https://doi.org/10.5032/jae.2013.01153

McCubbins, O. P., Anderson, R. G., Paulsen, T. H., & Wells, T. (2016). Teacher-perceived Adequacy of Tools and Equipment Available to Teach Agricultural Mechanics. *Journal of Agricultural Education,* 57(3), 223-236. https://doi.org/10.5032/jae.2016.03223

McCubbins, O. P., Wells, T., Anderson, R. G., & Paulsen, T. H. (2017). Examining the relationship between the perceived adequacy of tools and equipment and perceived competency to teach agricultural mechanics. *Journal of Agricultural Education, 58*(2), 268-283. https://doi.org/10.5032/jae.2017.02268

Ogbu, J. (2015). Influences of Inadequate Instructional materials and facilities in teaching and learning of electrical/electronic technology education courses. *Journal of Vocational and Technical Education,* 7(3), 20-27. https://doi.org/5897/IJVTE2014.0164

Oakes, J., & Saunders, M. (2002). *Access to textbooks, instructional materials, equipment, and technology: Inadequacy and inequality in California's public schools.* UCLA: 's Institute for Democracy, Education, and Access. https://escholarship.org/uc/item/4ht4z71v

Roberts, T. G., Harder, A., & Brashears, M. T. (Eds). (2016). *American Association for Agricultural Education national research agenda: 2016-2020.* Gainesville, FL: Department of Agricultural Education and Communication. 19-28.

Saucier, P. R., Vincent, S. K., & Anderson, R. G. (2014). Laboratory safety needs of Kentucky school-based agricultural mechanics teachers. Journal of Agricultural Education, 55(2), 184- 200. https://doi.org/10.5032/jae.2014.02184

Tasks Associated with Teaching School-Based Agricultural Education: Classroom and Laboratory Instruction

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Introduction/Theoretical Framework

Expectations placed on SBAE teachers are wide and varied (Traini et al., 2021). They are expected to fill a vast array of roles and responsibilities (Phipps et al., 2008; Talbert et al., 2014, Terry & Briers, 2010). Needs of teachers (DiBenedetto et al., 2018; Roberts et al., 2020), challenges faced by teachers (Boone & Boone, 2007, 2009), and characteristics of effective teachers (Eck et al., 2019; Roberts & Dyer, 2004) provide insight into the nature of teaching SBAE and the expected roles of such teachers (Traini et al., 2021). The combination of professional needs, challenges, and expected characteristics creates a complex system for SBAE teachers to navigate (Haddad et al., 2022; Traini et al., 2021). One such area in which teachers are expected to perform job-specific tasks is classroom and laboratory instruction.

Classroom and laboratory instruction in SBAE refer to learning activities which promote the acquisition of knowledge, skills, and competencies "within the confines of learning facilities" (Croom, 2008, p. 110). Such learning activities are developed and taught by SBAE teachers to teach interdisciplinary skills within the context of agriculture (National FFA Organization, 2023a; Phipps et al., 2008). SBAE is offered both as a content and context for learning other subject areas (Roberts & Ball, 2009). The use of inquiry-based and problem-solving approaches in classroom instruction provide students a rich learning environment in which skills are acquired through the context of agricultural application (Parr & Edwards, 2004; Phipps et al., 2008; Talbert et al., 2014). As such, in-depth planning and preparation are required on behalf of SBAE teachers to deliver meaningful and robust lessons (Torres et al., 2008; Roberts & Kitchel, 2010), and a significant amount of time is spent planning for instruction in SBAE (Lambert et al., 2011; Robinson et al., 2010; Torres et al., 2008; Torres & Ulmer, 2007).

Research indicates *general* tasks associated with teaching SBAE, such as excessive paperwork, working overtime, and meeting deadlines, can be sources of stress for teachers (Torres et al., 2009). However, determining *specific* tasks required of SBAE teachers is a difficult undertaking. Although the tasks of teaching SBAE can be inferred from the above-mentioned professional needs, challenges, and characteristics, limited literature exists detailing the specific tasks SBAE teachers are expected to perform. Identifying a comprehensive list of such would offer insight into the daily demands of the profession and provide context and backgrounding for future research in the field. To better understand expectations placed on SBAE teachers, Traini et al. (2021) recommended the profession should compile a "flexible position description of the agriculture teaching job detailing tasks that are expected as well as those that are not expected" (p. 179). Therefore, the purpose of the study was to identify the tasks

associated with the roles and responsibilities of SBAE teachers, specifically with the objective to determine the tasks associated with classroom and laboratory instruction.

The theoretical framework for this study was Human Capital (HC) theory. HC evaluates the acquisition of knowledge, skills, training, experiences, and education by individuals (Becker, 1964; Little, 2003; Shultz, 1971; Smith, 2010; Smylie, 1996). An important aspect of HC involves the explanation of employability in terms of the investment an individual makes in themselves and the attractiveness of that skillset to a prospective employer (Becker, 1964); therefore, "as people increase their human capital, they become more employable . . ." (Robinson & Baker, 2013, p. 152). As such, Smith (2010) found that individuals tend to acquire specialized skills as they engage in work they prefer, giving rise to "sector-specific" (p. 42) skills which complement natural talent and occupational abilities. Moreover, Heckman (2000) maintained individuals' job performances were enhanced by the acquisition and development of such skills.

Methods/Procedures

A three-round modified Delphi method was used to meet the study's objectives. This method is considered a multiple-round approach to collecting data in which "three iterations are often sufficient to collect the needed information and to reach a consensus in most cases" (Hsu & Sandford, 2007, p. 2). Stitt-Gohdes and Crews (2004) stressed that selection of the panel of experts is among the most crucial aspects of the Delphi method and should be those ". . . who are knowledgeable about current information and perceptions regarding the topic under investigation but are open-minded to the findings" (pp. 60–61).

The frame for the study consisted of doctoral students in agricultural education identified by department heads of agricultural education academic units across the United States. As recent, former, or current SBAE teachers, this population was identified as an appropriate group of potential Delphi panelists due to their knowledge of and competence in SBAE as well as their desire to pursue a terminal professional degree in the field. Potential panelists were deemed qualified to participate in the study based on the following criteria: 1) Potential panelists were currently enrolled in a doctoral program (Ph.D. or Ed.D.) in agricultural education with aspirations of moving into the professoriate or an advanced leadership position, 2) Potential panelists were former or current SBAE teachers with a minimum of three years of SBAE teaching experience, and 3) Potential panelists were "highly trained and competent within the specialized area of knowledge" (Hsu & Sandford, 2007, p. 3) regarding SBAE.

On September 13, 2022, an email was sent to department heads of 22 agricultural education programs offering a doctoral degree requesting the names and email addresses of students enrolled in their doctoral programs. Of those, 13 (59.09%) responded, identifying a total of 40 doctoral students as potential Delphi panelists meeting the criteria for the study. Subsequent emails were sent to panelists each round with a link to respective instruments requesting their participation in the study following the Tailored Design Method (Dillman et al., 2014). In all, 23 (57.50%) of the initial 40 potential panelists responded to Round 1. Therefore, the 23 respondents were considered the panel of experts for the study. Twenty-two (95.65%) expert panelists responded to Round 2, and 20 (86.96%) expert panelists responded to Round 3.

The instruments used in this study were evaluated for face and content validity by a group of eight experts considered knowledgeable of social science research and SBAE (Gay et al., 2006), including six teacher educators in agricultural education, one statistician who specialized in survey research and instrument design, and one graduate student who was a former SBAE teacher and seeking an advanced degree in agricultural education at Oklahoma State University. Moreover, reliability in Delphi studies is dependent on maintaining a certain threshold of participants throughout the duration of the study. Dalkey et al. (1972) indicated 13 responses are needed to establish a reliability coefficient of .90 within Delphi studies. Because the response rates of the study exceeded 13 participants per round, and because each round was comprised of the same participants who chose to be consistent in their responses to the three separate instruments, the study's results are assumed to be reliable.

The initial email to the 40 identified potential panelists was sent on September 29, 2022, describing the study and inviting them to participate. A Qualtrics Survey link to the Round 1 instrument was sent to panelists containing questions pertaining to the personal and professional characteristics of the panel of experts as well as the following open-ended question: *What tasks are associated with the roles and responsibilities of a SBAE teacher regarding classroom and laboratory instruction in a typical year?* Panelists were asked to type as many responses as they deemed appropriate for this question. Original tasks identified by panelists in Round 1 were analyzed using the constant comparison procedure (Creswell & Guetterman, 2019).

Round 2 of the Delphi study sought to establish consensus of agreement among panelists (Barrios et al., 2021). An electronic message was sent on November 22, 2022, to the 23 panelists responding to Round 1 with a Qualtrics Survey link to the Round 2 instrument. Tasks identified in Round 1 were presented to panelists to assess their perceived level of agreement for each task. Panelists were asked to indicate their level of agreement on a four-point agreement scale *(1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree)*. An 80.00% level of agreement was selected to reach consensus, indicating tasks receiving a score of 3 or 4 by 80.00% of panelists were retained as tasks achieving consensus of agreement (Diamond et al., 2014). Tasks achieving 51.00% to 79.99% agreement were retained for use in Round 3. Tasks achieving less than 51.00% agreement among panelists were considered to have not reached consensus of agreement and were removed from the study.

Round 3 of the study sought to refine consensus of agreement among panelists (Brady, 2015). An electronic message was sent on December 12, 2022, to the 22 panelists responding to Round 2 of the study with a Qualtrics Survey link to the Round 3 instrument. Tasks identified in Round 2 achieving a level of agreement from 51.00% to 79.99% were again presented to panelists to continue developing consensus of agreement for each task (Buriak & Shinn, 1989). Panelists were asked to indicate whether they agreed the task should be included by selecting either 1 for *No* or 2 for *Yes*. The 80.00% level of agreement identified *a priori* also was used for Round 3 analysis. Tasks receiving this level of agreement were considered to have reached consensus of agreement among panelists and were included in the final list of tasks associated with teaching SBAE. Tasks achieving a level of agreement of less than 80.00% failed to reach consensus of agreement and were removed from the study. Tasks achieving the 80.00% level of agreement in Round 2 and Round 3 were combined to form a final list of tasks.

Results/Findings

Results indicate 60.87% (*f* = 14) of panelists were female, 22 (95.65%) were traditionally certified SBAE teachers, 91.30% (*f* = 21) were white, and the average age of respondents was 33.78 years. Respondents taught in 16 different states and 5 (21.74%) were currently teaching SBAE. The average number of years of teaching experience was 8.39 years. In Round 1, panelists identified 265 original tasks associated with the roles and responsibilities of SBAE teachers regarding classroom and laboratory instruction in a typical year. Duplicated tasks were removed, and 84 tasks classified into 14 themes remained for consideration in Round 2. Themes identified in Round 1 included Authentic Skill Development (*f* = 9), Classroom Management (*f* = 3), Clerical Work (*f* = 8), Inclusive Teaching (*f* = 8), Instructional Design (*f* = 6), Lesson Preparation (*f* = 9), Lifelong Learning (*f* = 6), Relationships and Rapport (*f* = 9), School Safety (*f* = 4), Student Evaluation (*f* = 2), Student Motivation (*f* = 2), Teaching and Instruction (*f* = 7), Teaching and Learning Resources (*f* = 10), and Teaching and Learning Supplies (*f* = 2).

In Round 2, panelists reached consensus of agreement for 72 of 84 tasks (85.70%) associated with teaching SBAE in the area of classroom and laboratory instruction in a typical year. Of the tasks achieving consensus of agreement, 45 reached 100.00% agreement among panelists. Nine statements reached a level of agreement from Round 2 between 51.00% and 79.99%, advancing to Round 3 for consideration by the panelists. Three tasks failed to reach at least 51.00% agreement; therefore, they were eliminated from the study. Of the nine tasks achieving between 51.00% and 79.99% agreement in Round 2, panelists reached consensus of agreement (80.00% of panelists or greater selecting *Yes*) for two items: Adapt content for hybrid instruction (*M* = 1.80, *SD* = 0.41), and Serve on various committees (*M* = 1.80, *SD* = 0.41). Both of these tasks comprised the Teaching and Instruction theme. Seven tasks failed to reach consensus of agreement and were eliminated from the study. In the area of Authentic Skill Development, Obtain industry-based certification (IBC) for teachers (*M* = 1.55, *SD* = 0.51) reached 55.00% agreement and was eliminated from the study. Two tasks were eliminated for Clerical Work: Secure funding for the learning environment (*M* = 1.75, *SD* = 0.44), and Write grants (*M* = 1.70, *SD* = 0.47). One task was eliminated from the area of Instructional Design: Create curriculum map across AFNR pathways (*M* = 1.75, *SD* = 0.44). One task was eliminated from Lifelong Learning: Coordinate with all school staff to facilitate learning (*M* = 1.75, *SD* = 0.44), and two tasks were eliminated from Teaching and Learning Resources: Maintain school project center (*M* = 1.70, *SD* = 0.47), and Manage animals housed at school facilities (*M* = 1.70, *SD* = 0.47). Tasks achieving at least an 80.00% consensus of agreement in both Round 2 (72 of 84 tasks) and Round 3 (2 of 9 tasks) were compiled into a final list of tasks associated with teaching SBAE in classroom and laboratory instruction. In total, 74 tasks in 14 themes, reached consensus of agreement.

Conclusions/Recommendations/Implications

Based on the findings of the study, it can be reasonably concluded that tasks related to classroom and laboratory instruction are integral to the success of SBAE teachers. As an entity of CTE, the value of the instructional component of the SBAE model has been emphasized since the passage of the Smith-Hughes Act of 1917 (Phipps et al., 2008). To that end, the findings of the study support the notion that SBAE is highly dependent on the tasks teachers are expected to

perform regarding classroom and laboratory instruction. Three overarching themes emerged in the study as conclusions related to classroom and laboratory instruction.

First, it is concluded that SBAE teachers are relationship builders. The findings of the study indicate teachers should develop relationships with students, colleagues, administrators, alumni, students' parents, and the community in which they teach. This conclusion is based on the inclusion of themes related to building relationships and rapport among students and stakeholders, motivating students to learn, and including all learners in the instructional process. Tasks related to this conclusion include serving as a mentor for students, building relationships with students, creating an inclusive learning environment, and motivating students to learn. These conclusions align with findings from Eck et al. (2019) who found teachers should be relatable, student focused, and empathetic while Roberts and Dyer (2004) identified caring for students, working well with parents, establishing strong community relationships, and working well with alumni as characteristics of effective SBAE teachers.

Second, it is concluded that SBAE teachers are competency driven. From the content they teach to their own professional development, SBAE teachers value competency and technical skill acquisition. This conclusion is supported by themes such as Authentic Skill Development and Instructional Design. Specific tasks aligning with this conclusion include assisting students in obtaining industry-based certifications, teaching practical skills to students, providing inquiry-based learning opportunities for all courses, aligning curriculum to appropriate standards, and applying curriculum concepts to real-world situations and scenarios, to name a few. This reinforces findings from DiBenedetto et al. (2018) who found the acquisition of technical, competency-driven skills as a professional need of SBAE teachers. In addition, it supports the content-based model proposed by Roberts and Ball (2009) by demonstrating the need for technical agricultural skill acquisition.

Third, it is concluded that SBAE teachers are quality instructors. Specifically, SBAE teachers plan for and execute effective instruction in various settings including the classroom, laboratories, and informal teaching environments. This instruction is intentional and well thought out. Teachers spend a significant amount of time planning for instruction which is consistent with previous research (Lambert et al., 2011; Robinson et al., 2010; Torres et al., 2008; Torres & Ulmer, 2007). These conclusions are based on the inclusion of tasks such as instructing students, managing the classroom, organizing teaching materials and resources, practicing labs ahead of time, preparing daily lesson plans, preparing lab and classroom facilities for instruction, and managing time for preparation.

Due to the sample size and the nature of the Delphi method (Hsu & Sandford, 2007), the findings of the study should not be generalized to the general SBAE population. To address this limitation, the study should be replicated with a larger participant size and broader scope. Specifically, it is recommended that a national study be conducted consisting of respondents across all career phases (i.e., early, mid, and late career). In addition, a study should be conducted with pre-service SBAE teachers to determine the specific job tasks for which they are competent and the ones in which they need additional support. Studies should be conducted in each state to determine the tasks of SBAE teachers specific to the state or region in which they teach. In terms of practice, it is recommended that teacher preparation programs evaluate the

tasks required of SBAE for overlap with instructional content intended for pre-service teachers. Further, the findings of this study can better inform potential teachers of the specific job-task expectations of the profession, allowing them to better determine if the profession is the right fit for them. Teacher attrition and retention rates may be impacted by such decision-making as preservice teachers who are less likely to remain in teaching may choose a different career path.

References

Barrios, M., Guilera, G., Nuño, L., & Gómez-Benito, J. (2021). Consensus in the Delphi method: What makes a decision change? *Technological Forecasting & Social Change, 163*, 1–10. https://doi.org/10.1016/j.techfore.2020.120484

Becker, G. (1964). *Human capital: A theoretical and empirical analysis with special reference to education.* The University of Chicago Press.

Boone, H. N., & Boone, D. A. (2007). Problems faced by high school agricultural education teachers. *Journal of Agricultural Education, 48*(2), 36–45. https://doi.org/10.5032/jae.2007.02036

Boone, H. N., & Boone, D. A. (2009). An assessment of problems faced by high school agricultural education teachers. *Journal of Agricultural Education, 50*(1), 21–32. https://doi.org/10.5032/jae.2009.01021

Brady, S. (2015). Utilizing and adapting the Delphi method for use in qualitative research. *International Journal of Qualitative Methods, 14*(5), 1–6. https://doi.org/10.1177/1609406915621381

Buriak, P., & Shinn, G. C. (1989). Mission, initiatives, and obstacles to research in agricultural education: A national Delphi using external decision-makers. *Journal of Agricultural Education, 30*(4), 14–23. https://doi.org/10.5032/jae.1989.04014

Creswell, J. W., & Guetterman, T. C. (2019). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (6th ed.). Pearson Education Inc.

Croom, D. B. (2008). The development of the integrated three-component model of agricultural education. *Journal of Agricultural Education, 49*(1), 110–120. https://doi.org/10.5032/jae.2008.01110

Dalkey, N. C., Rourke, D. L., Lewis, R., & Snyder, D. (1972). *Studies in the quality of life.* Lexington Books.

Diamond, I. R., Grant, R. C., Feldman, B. M., Pencharz, P. B., Ling, S. C., Moore, A. M., & Wales, P. W. (2014). Defining consensus: A systematic review recommends methodologic criteria for reporting of Delphi studies. *Journal of Clinical Epidemiology, 67*(4), 401–409. https://doi.org/10.1016/j.jclinepi.2013.12.002

DiBenedetto, C. A., Willis, V. C., & Barrick, R. K. (2018). Needs assessments for school-based agricultural education teachers: A review of literature. *Journal of Agricultural Education, 59*(4), 52–71. https://doi.org/10.5032/jae.2018.04052

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed-mode surveys: The tailored design method* (4th ed.). Wiley.

Eck, C. J., Robinson, J. S., Ramsey, J. W., & Cole, K. L. (2019). Identifying the characteristics of an effective agricultural education teacher: A national study. *Journal of Agricultural Education, 60*(4), 1–18. https://doi.org/10.5032/jae.2019.04001

Gay, L. R., Mills, G. E., & Airasian, P. (2006). *Educational research: Competencies for analysis and research* (8th ed.). Pearson Education Inc.

Haddad, B., Traini, H. Q., & McKim, A. J. (2022, May 16–19). *We've crossed a line: A philosophical examination of systemic implications surrounding SBAE teachers' attempts at boundary setting* [Paper presentation]. American Association for Agricultural Education National Research Conference, Oklahoma City, OK, United States. https://aaea.wildapricot.org/resources/Documents/National/2022Meeting/2022AAAEPaperProceedings.pdf

Heckman, J. L. (2000). *Invest in the very young*. Ounce of Prevention Fund. https://www.impactforequity.org/wp-content/uploads/2014/01/Heckman-Invest-In-Very-Young.pdf

Hsu, C. C., & Sandford, B. A. (2007). The Delphi technique: Making sense of consensus. *Practical Assessment, Research, and Evaluation, 12*, Article 10. https://doi.org/10.7275/pdz9-th90

Lambert, M. D., 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. https://doi.org/10.5032/jae.2011.03050

Little, A. W. (2003). Motivating learning and the development of human capital. *British Association for International and Comparative Education, 33*(4), 437–452. https://doi.org/10.1080/0305792032000127748

National Council for Agricultural Education (2012). *Agricultural education*. https://thecouncil.ffa.org/ageducation/

National FFA Organization (2023a). *Agricultural education*. https://www.ffa.org/agricultural-education/

Parr, B., & Edwards, M. C. (2004). Inquiry-based instruction in secondary agricultural education: Problem-solving an old friend revisited. *Journal of Agricultural Education, 45*(4), 106–117. https://doi.org/10.5032/jae.2004.04106

Phipps, L. J., Osborne, E. W., Dyer, J. E., & Ball, A. (2008). *Handbook on agricultural education in public schools* (6th ed.). Thomson Delmar Learning.

Roberts, R., Wittie, B. M., Stair, K. S., Blackburn, J. J., & Smith, H. E. (2020). The dimensions of professional development needs for secondary agricultural education teachers across career stages: A multiple case study comparison. *Journal of Agricultural Education, 61*(3), 128–143. https://doi.org/10.5032/jae.2020.03128

Roberts, T. G., & Ball, A. L. (2009) Secondary agricultural science as content and context for teaching. *Journal of Agricultural Education, 50*(1), 81–91. https://doi.org/10.5032/jae.2009.01081

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

Roberts, T. G., & Kitchel, T. (2010). Designing professional knowledge curriculum and instruction. In R. M. Torres, T. Kitchel, & A. L. Ball (Eds.), *Preparing and advancing teachers in agricultural education* (pp. 100–111). The Ohio State University Curriculum Materials Service.

Robinson, J. S., & Baker, M. A. (2013). The effect of human capital on principals' decisions to interview candidates in agricultural education: Implications for pre-service teachers. *Journal of Agricultural Education, 54*(1), 139–152. https://doi.org/10.5032/jae.2013.01139

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

Shultz, T. W. (1971). *Investment in human capital: The role of education and of research*. The Free Press.

Smith, E. (2010). Sector-specific human capital and the distribution of earnings. *Journal of Human Capital, 4*(1), 35–61. https://doi.org/10.1086/655467

Smylie, M. A. (1996). From bureaucratic control to building human capital: The importance of teacher learning in education reform. *Educational Researcher, 25*(9), 9–11. https://doi.org/10.3102/0013189X025009009

Stitt-Gohdes, W. L., & Crews, T. B. (2004). The Delphi technique: A research strategy for career and technical education. *Journal of Career and Technical Education, 20*(2), 55–67. https://files.eric.ed.gov/fulltext/EJ1069510.pdf

Talbert, B. A. S., Vaughn, R., Croom, B., & Lee, J. S. (2014). *Foundations of agricultural education.* Pearson Education, Inc.

Terry, R., Jr., & Briers, G. E. (2010). Roles of the secondary agriculture teacher. In R. M. Torres, T. Kitchel, & A. L. Ball (Eds.), *Preparing and advancing teachers in agricultural education* (pp. 86–99). The Ohio State University Curriculum Materials Service.

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. https://doi.org/10.5032/jae.2007.02001

Torres, R. M., Lawver, R. G., & Lambert, M. D. (2009). Job related stress among secondary agricultural education teachers: A comparison study. *Journal of Agricultural Education, 50*(3), 100–111. https://doi.org/10.5032/jae.2009.03100

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

Traini, H. Q., Haddad, B., Stewart, J., & Velez, J. J. (2021). Adjusting, appeasing, and rearranging: How agriculture teachers reconcile the demands of the profession. *Journal of Agricultural Education*, *62*(2), 167–184. https://doi.org/10.5032/jae.2021.02167

Effectiveness in the Classroom: A Quantitative Evaluation of Agricultural Educators' Competence Levels Regarding the Qualities of an Effective Teacher

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Introduction, Purpose, and Objectives

Research inquiries assessing the qualities of an effective educator have been conducted for decades (Eck et al., 2019; Eck et al., 2020; Eck et al., 2021; Juergenson, 1963; Roberts et al., 2006; Robinson et al., 2013; Rush & Crunkilton, 1985). While many of the qualities necessary for success in the classroom have remained consistent over time, some of the required knowledge, skills, and dispositions have evolved with the profession (Eck et al., 2019; Eck et al., 2020; Eck et al., 2021). Agricultural educators are expected to provide engaging and student-centered instruction that educates youth on a myriad of topics, many of which did not exist just a few years ago (Eck et al., 2019). The resulting changes in agricultural education have primarily stemmed from the technological and scientific evolution of the agricultural industry (Hillison, 1996; Scherer et al., 2019). The importance of highly effective educators is evident in the relevant literature, and studies show that teaching effectiveness is directly linked to higher student academic achievement (Chiasson & Burnett, 2001; Nolin & Parr, 2013; Theriot & Kotrlik, 2009). Additionally, agricultural education has proven to be effective at improving student math achievement (Nolin & Parr, 2013), science achievement (Chiasson & Burnett, 2001; Theriot & Kotrlik, 2009), graduation rates (McKim et al., 2018), and post-graduation income (McKim et al., 2018).

In 1971, Rosenshine and Furst noted five central characteristics of an effective educator, including clarity, variability, enthusiasm, student opportunity to learn the material, and task-oriented/business-like behavior. While not specific to agricultural education, these characteristics begin to establish a foundation to describe the qualities of an effective teacher. Agricultural educators are required to balance the three areas of agricultural education, including Classroom Instruction, Supervised Agricultural Experience (SAE), and FFA (Croom, 2008). Considering agricultural education's traditionally experiential nature, the necessary knowledge, skills, and dispositions are intrinsically different from those of traditional core educators (Eck et al., 2019; Eck et al., 2020; Eck et al., 2021). Agricultural educators are required to be proficient in Work-Based Learning (WBL) (ie. SAE) management, lab instruction, classroom instruction, and organization management (ie. FFA) (Croom, 2008). This unique set of duties beckons a unique set of qualities to be effective in the profession.

Eck et al. (2019), utilized expert consensus in a Delphi study to establish 35 different qualities of an effective agricultural educator. These individual characteristics were categorized into the areas of instruction, FFA, SAE, program planning, balance, diversity and inclusion, professionalism, and personal disposition (Eck et al., 2019). Many of these characteristics are further supported by research conducted in areas outside of agricultural education (Darling-Hammond et al., 2012; Duckworth et al., 2009; Muijs et al., 2014).

Currently, there is a lack of information on how agricultural educators regard their personal competence in the qualities of an effective educator. The purpose of this study was to examine the perceptions of agricultural educators regarding their competence in the qualities of an effective educator. The following research objective was assessed:

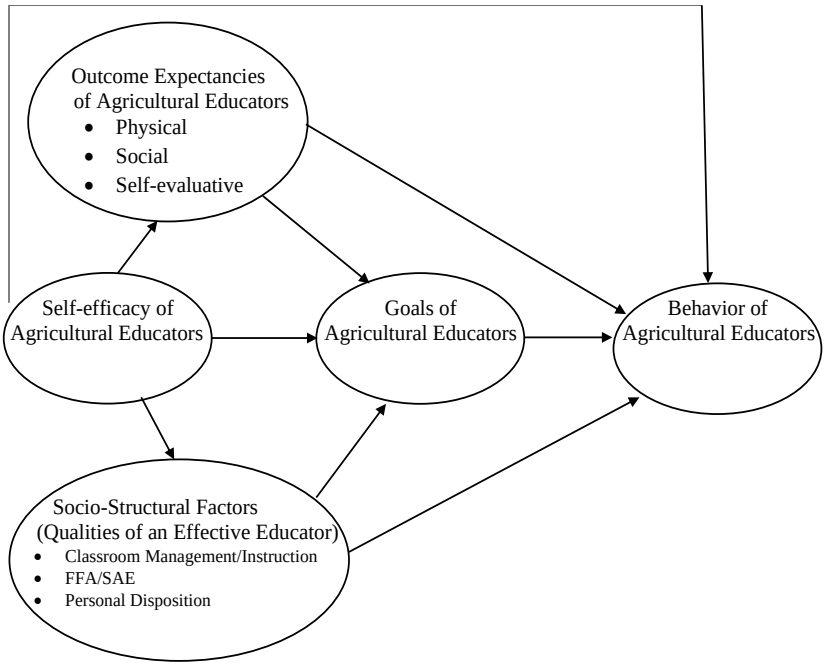
1.) Describe the degree of competence that participating agricultural educators have regarding the qualities of an effective educator.

Theoretical Framework

Bandura's (1994) self-efficacy theory served as the theoretical framework for this study. This theory defines self-efficacy as an individual's belief in their capability to perform a task and produce specific outcomes. According to this theory, self-efficacy is influenced by outcome expectations and socio-structural factors, which in turn effects goals and ultimately drives behavior. In the context of this study, socio-structural factors such as agricultural educators' perceived effectiveness as an educator play a significant role in their self-efficacy and goals. These factors also influence outcome expectations and, subsequently, behavior. Identifying the degree of competence that participating agricultural educators have regarding the qualities of an effective educator could help identify gaps in the behavior and preparedness of agricultural educators.

Figure 1

Impact of Agricultural Educator's Competence on Qualities of an Effective Educator



Methods

In this study, agricultural educators' perceptions of their competence in the qualities of an effective teacher were evaluated using a descriptive correlational research design. A Qualtrics survey was distributed to agricultural educators in three western region states: New Mexico,

Utah, and Montana to gather data on these perceptions. The instrument utilized a Likert scale with the following range: 1 = *Not Competent at All*; 2 = *Somewhat Competent*; 3 = *Moderately Competent*; 4 = *Very Competent*; 5 = *Extremely Competent*.

The instrument used was modified from Eck et al.'s (2019) study. A total of 30 of Eck et al.'s original 35 identified characteristics were used to develop the instrument for this study. Since Eck et al. had previously evaluated the instrument's validity through the Delphi process, a pilot study was deemed unnecessary, and the instrument's reliability was assessed *post hoc*. The researchers employed Cronbach's Alpha reliability coefficients to measure the scales' reliability, and the instrument's reliability coefficient was .978. According to Gliem and Gliem (2003), a reliability coefficient of .7 or higher is acceptable. The results suggest that the instrument was sufficiently reliable and appropriate for the study's purpose.

To compile the study frame, agricultural educator directories were used from each state. When distributing the survey, 4.2% of the emails were invalid and categorized as frame error. Systematic sampling was implemented to avoid any sampling bias, where every second agricultural educator listed in the directory was chosen for the study. The frame contained a total of 204 viable emails, with 62 from New Mexico, 80 from Utah, and 62 from Montana. Hill (1998) claims that a response rate of at least 10% is crucial for conducting high-quality descriptive research. This study's total response rate was 30.39% (n = 62), exceeding the necessary threshold. Additionally, (n = 12) incomplete responses were included in the study.

To evaluate potential non-response bias and early-late response bias, a t-test was employed, as described by Lindner et al. (2001). Each agricultural educator received a total of four weekly emails to encourage their participation. To examine the impact of response timing, respondents were categorized as either early (n = 41) if they responded to the first two emails or late (n = 21) if they responded to the last two. Despite these measures, statistical analysis revealed no significant differences in response bias.

Results

The participants ranked their competency on each quality of an effective educator as *Very Important* or *Extremely Important*. The area with the highest competency ratings included diversity and inclusion (M = 4.54, SD = .724), professionalism (M = 4.37, SD = .776), and personal dispositions (M = 4.36, SD = .753). Within these areas, the highest ranked individual qualities included "Is a hard worker" (M = 4.67, SD = .648), "Is a dedicated professional" (M = 4.60, SD = .721), and "Cares about Students" (M = 4.56, SD = .721). The lowest ranked areas included Instruction (M = 4.28, SD = .774), program planning (M = 4.27, SD = .836), and SAE (M = 4.02, SD = 1.04). The lowest ranked individual areas include "Instructs students through supervised agricultural experiences" (M = 4.02, SD = 1.04), "Is organized" (M = 4.04, SD = .949), "Is engaging" (M = 4.04, SD = .791), and "Is an advocate for public education" (M = 4.04, SD = .791). The results from research objective one are presented in Table 1.

Table 1

Descriptive Statistics for Qualities of an Effective Educator

	M	*SD*
Individual Qualities		
Diversity and Inclusion	**4.54**	**.724**
Cares about all students	4.56	.777
Understands there is not an award for all students, but that does not mean they are not valuable	4.52	.671
Professionalism	**4.37**	**.776**
Is a dedicated professional	4.60	.721
Demonstrates adaptability	4.44	.725
Is engaged in an appropriate professional organization	4.38	.867
Is an advocate for public education	4.04	.791
Personal Dispositions	**4.36**	**.753**
Is a hard worker	4.67	.648
Is genuine	4.58	.637
Is passionate about agriculture	4.56	.698
Is helpful	4.52	.610
Has patience	4.10	.934
Is organized	4.04	.949
Is engaging	4.04	.791
FFA	**4.35**	**.817**
Advises the FFA chapter	4.56	.725
Advises the FFA officers	4.44	.725
Is passionate about FFA	4.33	.901
Instructs students through the FFA	4.31	.897
Prepares students to be leaders	4.27	.770
Is not just a facilitator of record keeping for degrees and awards	4.19	.886
Balance	**4.29**	**.906**
Demonstrates a willingness to put in extra hours	4.52	.874
Is never afraid to ask for help	4.06	.938
Instruction	**4.28**	**.774**
Is motivated for student success	4.56	.725
Is knowledgeable about agriculture	4.40	.664
Is innovative	4.29	.800
Is first and foremost a classroom teacher	4.25	.789
Demonstrates classroom management	4.13	.864
Understands experiential education theory	4.06	.802
Program Planning	**4.27**	**.836**
Is resourceful as an administrator of the program	4.44	.873
Uses the complete agricultural education model as a guide to programmatic decisions and practices.	4.10	.799
SAE	**4.02**	**1.04**
Instructs students through supervised agricultural experiences.	4.02	1.04

Note. 1 = *Not Competent at All*; 2 = *Somewhat Competent*; 3 = *Moderately Competent*; 4 = *Very Competent*; 5 = *Extremely Competent*. The retention of partial responses causes the *n* to vary within the analysis.

Conclusions, Discussions, and Recommendations

When analyzing the results, teachers ranked their perceived competence as *Very Competent* to *Extremely Competent* in the self-assessment. The means ranged from $M = 4.02$ on SAE instruction to $M = 4.67$ on the personal disposition of being a hard worker. It would be easy to conclude that all is well with how effective the teachers are who responded to the survey. Based on the standard deviations, teachers ranged from approximately 2.98 to a maximum high of 5.00. This could be interpreted that participating educators who rated their competence within two standard deviations of the mean ranged from approximately 59.6% to 100% of maximum effectiveness.

There is a lot of positivity to be taken from the study, especially the fact that the highest mean for a single category was 4.54 on inclusion and diversity with a moderately low standard deviation of .724. From a societal view, this is extremely important for the profession to promote in a world where inclusion and diversity are front and center in so many of the discussions today.

A negative taken from the data is that SAE is the least effective category of teaching based on the teachers' self-assessment. The fact that one of the foundational components in the three-component model for agricultural education is last in the rank order of effective teaching should be concerning for the profession and especially for those individuals in teacher preparation and program administration. It has been noted for decades that the implementation of SAE has declined in many secondary agricultural education programs (Clark & Scanlon, 1996; Dyer & Osborne, 1995; Warren & Flowers, 1993). According to Retallick (2010), "…teachers do not practice SAE as it was conceptualized; they talk about SAE conceptually but do not practice it, which is consistent with Dyer and Osborne (1995) and Wilson and Moore (2007)". In addition, out of the eight assessed categories, program planning and instruction are second and third from last. If we take the data at face value, teacher educators should focus teacher preparation with an emphasis on the areas of instruction, program planning, and SAE to ensure educators are prepared.

Overall, it is recommended to clarify the perceptions of effective teaching based on data collected from students, former students, administrators, and stakeholders. Modifying professional development for in-service and preservice educators could assist in closing the gaps identified in educator competence. An additional issue for further examination is whether a five-point Likert scale is the best strategy for evaluating self-assessments. Furthermore, what effect does the scale labeling have on the analysis and interpretation of the data collected. In other words, is going from *Very Competent* to *Extremely Competent* the same measurement as going from *No Competence at all* to *Somewhat Competent*?

Effective teaching is critical to our success as educators and professional practitioners of agricultural education should engage in activities to evaluate the profession with an emphasis on constant improvement and a progression towards excellence. Agricultural Education is arguably one of the most successful educational programs in our schools today. While not perfect, a fervent effort towards perfection can help guide the profession in a positive direction.

References

Bandura, A. (1994). *Self-efficacy*. In V. S. Ramachaudran (Ed.), Encyclopedia of human behavior (Vol. 4, pp. 71-81). New York: Academic Press.

Chiasson, T. C., & Burnett, M. F. (2001). The influence of enrollment in agriscience courses on the science achievement of high school students. *Journal of Agricultural Education*, *42*(1), 61-71. http://dx.doi.org/10.5032/jae.2001.01061

Clark, R. W., & Scanlon, D. C. (1996). The effects of teacher attitudes and related factors on FFA proficiency awards won above the federation level. *Journal of Agricultural Education*, *37*(2), 8–16. http://dx.doi.org/10.5032/jae.1996.02008

Croom, D. B. (2008). Development of the integrated three-component model of agricultural education. *Journal of Agricultural Education*, *49*(1), 110–120. http://dx.doi.org/10.5032/jae.2008.01110

Darling-Hammond, L., Amrein-Beardsley, A., Haertel, E., & Rothstein, J. (2012). Evaluating Teacher Evaluation. *Phi Delta Kappan*, *93*(6), 8– 15. https://doi.org/10.1177/003172171209300603

Duckworth, A. L., Quinn, P. D., & Seligman, E. P. (2009) Positive predictors of teacher effectiveness. *The Journal of Positive Psychology*, *6*(4), 540–547. http://dx.doi.org/10.1080/17439760903157232

Dyer, J. E., & Osborne, E. W. (1995). Participation in supervised agricultural experience programs: A synthesis of research. *Journal of Agricultural Education*, *36*(1), 6–14. http://dx.doi.org/10.5032/jae.1995.01006

Eck, C. J., Robinson, J. S., Ramsey, J. W., & Cole, K. L. (2019). Identifying the characteristics of an effective agricultural education teacher: A national study. *Journal of Agricultural Education*, *60*(4), 1-18. http://dx.doi.org/10.5032/jae.2019.04001

Eck, C. J., Robinson, J. S., Cole, K. L., Terry, J. R., & Ramsey, J. W. (2020). The validation of the effective teaching instrument for school-based agricultural education teachers. *Journal of Agricultural Education, 61*(4), 229–248. http://doi.org/10.5032/jae.2020.04229

Eck, C., Robinson, J. S., Cole, K., Terry, R, & Ramsey, J. (2021). Identifying the characteristics of effective school-based agricultural education teachers: A national census study. *Journal of Agricultural Education*, *62*(3), 292–309. https://doi.org/10.5032/jae.2021.03292

Gliem, J. A & Gliem, R. R. (2003). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales.* Midwest Research to Practice Conference in Adult, Continuing, and Community Education, https://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem%20%26%20Gliem.pdf?%20sequence=1&isAllowed=y

Hill, R. (1998). What Sample Size is 'Enough' in Internet Survey Research? *Interpersonal Computing and Technology: An electronic Journal for the 21st Century*. http://www.emoderators.com/ipct-j/1998/n3-4/hill.hmtl

Hillison, J. (1996). The origins of agriscience: Or where did all that scientific agriculture come from? *Journal of Agricultural Education*, *37*(4), 8–13. http://dx.doi.org/10.5032/jae.1996.04008

Juergenson, E. M. (1963). Making an effective teacher. *Journal of the American Association of Teacher Educators in Agriculture, 4*(2), 2. https://doi.org/10.5032/jaatea.1963.02002

Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43–53. https://doi.org/10.5032/jae.2001.04043

McKim, A. J., Velez, J. J., & Sorensen, T. J. (2018). A national analysis of school-based agricultural education involvement, graduation, STEM achievement, and income. *Journal of Agricultural Education, 59*(1), 70-85. http://dx.doi.org/10.5032/jae.2018.01070

Muijs, D., Kyriakides, L., Van Der Werf, G., Creemers, B., Timperley, H., & Earl, L. (2014). State of the art – teacher effectiveness and professional learning. *School Effectiveness and School Improvement*, *25*(2), 231–256. http://dx.doi.org/10.1080/09243453.2014.885451

Nolin, J. B., & Parr, B. (2013). Utilization of a high stakes high school graduation exam to assess the impact of agricultural education: A measure of curriculum integration. *Journal of Agricultural Education*, *54*(3), 41-53. http://dx.doi.org/10.5032/jae.2013.03041

Retallick, M. S., & Martin, R. A. (2005). Economic impact of supervised agricultural experience in Iowa: A trend study. *Journal of Agricultural Education, 46*(1), 44–54. http://dx.doi.org/10.5032/jae.2005.01044

Roberts, G. T., Dooley, K. E., Harlin, J. F., & Murphrey, T. P. (2006). Competencies and traits of successful agricultural science teachers. *Journal of Career and Technical Education, 22*(2), 1–11. http://dx.doi.org/10.21061/jcte.v22i2.429

Robinson, S. J., Kelsey, K. D., & Terry, R. D. (2013). What images show that words do not: Analysis of pre-service teachers' depictions of effective agricultural education teachers in the 21st century. *Journal of Agricultural Education, 54*(3), 126–139. https://www.doi.org/10.5032/jae.2013.0126

Rosenshine, B., & Furst, N. (1971). Research on teacher performance criteria. In B. O. Smith (ed.), *Research in Teacher Education – A Symposium* (pp. 37–72). Prentice Hall.

Rush, M. G., & Crunkilton, J. R. (1985). The relationship between teacher effectiveness and agreement with the philosophy adopted by the agricultural education profession. *Journal of the American Association of Teacher Educators in Agriculture, 26*(4), 43-54. https://doi.org/10.5032/jaatea.1985.04043

Scherer, H. H., McKim, A. J., Wang, H., DiBenedetto, C. A., & Robinson, K. (2019). Making sense of the buzz: A systematic review of "STEM" in agriculture, food, and natural resources education literature. *Journal of Agricultural Education, 60*(2), 28-53. http://dx.doi.org/10.5032/jae.2019.02028

Theriot, P. J., & Kotrlik, J. W. (2009). Effect of enrollment in agriscience on students' performance in science on the high school graduation test. *Journal of Agricultural Education*, *50*(4), 72-85. http://dx.doi.org/10.5032/jae.2009.04072

Warren, R. J., & Flowers, J. (1993). The relationship between North Carolina secondary agriculture teachers' use of time management practices and the quality of the supervised agricultural experience program component. *Journal of Agricultural Education*, *34*(3), 68–75. http://dx.doi.org/10.5032/jae.1993.03068

Wilson, E. B., & Moore, G. E. (2007). Exploring the paradox of supervised agricultural experience Programs in agricultural education. *Journal of Agricultural Education*, *48*(4), 82–92. http://dx.doi.org/10.5032/jae.2007.04082

Agricultural Education for All: Importance and Ability of Agricultural Educators to Integrate Special Education Competencies into Professional Practice

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Introduction, Purpose, and Objectives

As agricultural education has evolved over the last century, the diversity in the classroom has increased as students with special needs have gained a higher level of acceptance in traditional classroom settings (Aschenbrener et al., 2010; Easterly & Myers, 2011; Johnson et al., 2012; Ramage et al., 2021; Ramage et al., 2022; Wilkins-Brittain et al., 2022). In 1975, Gerald Ford signed the 'Education for All Handicapped Children Act', which introduced federal protections for the educational rights of students with special needs (Needham & Houck, 2019). This legislation required that students with special needs be placed in the Least Restrictive Environment (LRE), which is often the traditional classroom setting. (Treder et al., 2000). The differentiation and modification of instruction needed to meet the needs of students with special needs can be difficult for educators of all experience levels (Giffing et al., 2010; Wilkins-Brittain et al., 2022). As the prevalence of students with disabilities has increased in the agricultural education classroom, the need for educators to be competent in special education implementation is critical to meet the needs of these unique students (Aschenbrener et al., 2010; Easterly & Myers, 2011; Johnson et al., 2012; Ramage et al., 2022; Wilkins-Brittain et al., 2022). Differentiating and modifying instruction with compliance to students' 504 plans and Individualized Education Plans (IEPs) is critical for student success and providing access to agricultural education for all (Ramage et al., 2022; Wilkins-Brittain et al., 2022).

Federal law protects the educational rights of students with special needs through the passage of the Individuals with Disabilities Education Act (IDEA) in 2004 and Section 504 of the Rehabilitation Act passed in 1973 (Katsiyannis et al., 2001). These federal mandates require that students with special needs be placed in learning environments with students who do not have disabilities (Treder et al., 2000). Numerous lawsuits have successfully challenged this assertion, such as MR v. Lincolnwood Board of Education in 1994 (Boyle & Weishaar, 2001; Murdick et al., 2002). This ambiguity in the proper placement of students can create difficulty for educators.

The benefits of agricultural education and other forms of Career and Technical Education (CTE) for students with special needs include exposure to experiential instruction and the application of employability skills in an academic setting (Theobald et al., 2019). Furthermore, students with special needs that are enrolled in CTE benefit from higher earning potential, preparation for the workforce, and higher employment rates (Theobald et al., 2019; Wagner et al., 2016). For example, Johnson et al. (2012) found that 87% of North Carolina agricultural educators believed Supervised Agricultural Experiences (SAEs) helped students with special needs set career goals and enhanced their social skills due to the experiential nature of SAE. In addition, Giffing et al. (2010) found that 76.9% agreed that their courses are an appropriate placement for students with special needs. With approximately 96% of students with learning

disabilities enrolled in at least one CTE course (Wagner et al., 2016), educator competence in special education implementation is becoming increasingly critical for success in the secondary classroom (Levesque, 2003).

The purpose of this study was to examine the perceptions of agricultural educators on the importance of various competencies of special education implementation and their ability to integrate those competencies into their professional practice. Therefore, the following objective was assessed:

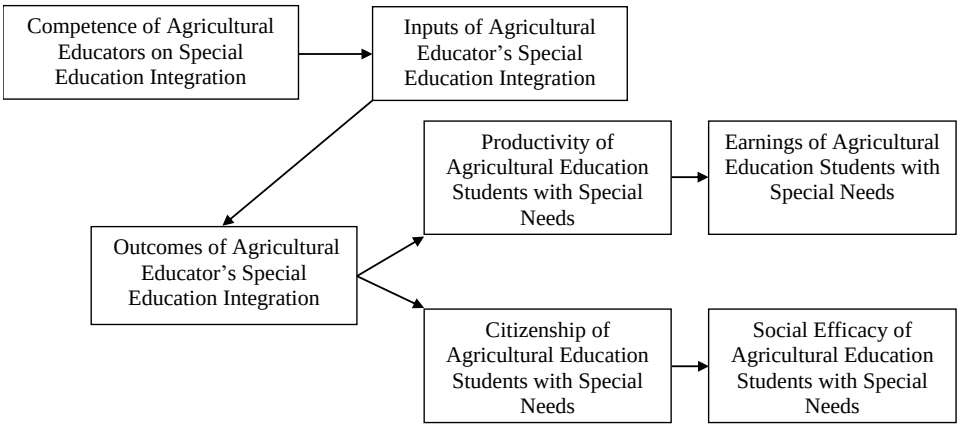
1.) Evaluate any differences in the perceptions of agricultural educators on the importance of various special education competencies and their ability to implement those competencies in professional practice using Ranked Discrepancy Scores (RDS).

Theoretical Framework

The theoretical framework used to guide this study was the Human Capital Theory (HCT). Developed by Becker (1993), the HCT asserts that inputs such as experience, education, and specialized training can increase an individual's competence in various areas of their career. As agricultural educators acquire more human capital, it expands their knowledge, skill, and abilities within special education integration. Therefore, the competence of agricultural educators to provide special education students with the proper instructional modifications and accommodations can directly influence the outcomes of agricultural education students with special needs. This interaction between the human capital inputs on agricultural educators' competence in special education integration and the improved outcomes of agricultural education students with special needs is depicted in Figure 1.

Figure 1

Impact of Agricultural Educator's Competence on Special Education Integration



Methods

This study utilized a descriptive correlational research design to evaluate the importance and ability of agricultural educators to integrate special education competencies into professional practice. The instrument was distributed via Qualtrics to agricultural educators in

three states in the western AAAE region including New Mexico, Utah, and Montana. The instrument utilized a modified Borich needs assessment to evaluate the perceptions of agricultural educators on the importance of various special education competencies and their ability to integrate them into professional practice. The Borich needs assessment utilized a Likert scale that ranged from 1 = *Not Important/Competent at All*; 2 = *Somewhat Important/Competent*; 3 = *Moderately Important/Competent*; 4 = *Very Important/Competent*; 5 = *Extremely Important/Competent*.

The instrument's reliability was assessed post hoc, and the instrument was deemed reliable for the study (Gliem & Gliem, 2003). Cronbach's Alpha was used to assess the reliability of scales measuring the importance of special education integration and the ability of agricultural educators to implement the assessed competencies. The reliability coefficient for the section of the instrument assessing competence was .925, and the section assessing importance was .963. The instrument used in the study was a modification of the instrument developed from Dingle et al.'s (2004) study. A pilot study was not conducted because Dingle et al. (2004) had previously assessed the instrument for reliability and validity.

The study frame was compiled by utilizing agricultural educator directories in each state. In the survey distribution, approximately 4.2% of the emails were invalid and considered frame error. Systematic sampling was utilized to reduce any sampling bias and every second agricultural educator in the directory was selected for the study. In total, the frame consisted of 62 viable emails in New Mexico, 80 in Utah, and 62 in Montana (N = 204). According to Hill (1998), a response rate of at least 10% is essential for conducting high-quality descriptive research. This study's total response rate was 30.39% (n = 62), surpassing the required threshold for this research. Furthermore, (n = 12) partial responses were retained in the study.

In order to evaluate non-response bias and early-late response bias, a t-test was utilized to assess any differences between the two groups (Lindner et al., 2001). A total of four emails were sent to each agricultural educator to stimulate responses. To evaluate early-late response bias, participants who responded to the first two emails (n = 41) were considered early respondents and participants who responded to the last two emails (n = 21) were considered late respondents. After the analysis, no statistical differences were found which suggests that no bias was present.

All data were analyzed utilizing SPSS Version 28.0. To assess research objective one, a modification of the Borich needs assessment model was used to evaluate the perceived importance of each special education competency and assess agricultural educators' ability within each competency. As recommended by Narine and Harder (2022), the Ranked Discrepancy Scores (RDS) model was used to measure differences between agricultural educators' perceived importance and ability within each special education competency. Narine and Harder (2022) recommend this method as an alternative to utilizing Mean Weighted Discrepancy Scores (MWDS) which are recommended by Borich (1980).

Results

Overall, agricultural educators ranked the importance of each special education competency as *Very Important* to *Extremely Important* with means ranging from (M = 4.44, SD = .664) to (M = 4.17, SD = .666). In addition, agricultural educators ranked their ability within

each competency as *Moderately Important* to *Very Important* with means that ranged from (*M* = 3.60, *SD* = .949) to (*M* = 4.23, *SD* = .612). The competencies with the highest RDS were "Knowledge of specialized instructional styles and non-traditional teaching practices and procedures" and "Facilitates the physical classroom environment that allows for flexible scheduling and transition times." These results would suggest that agricultural educators felt that their competence in these areas is lacking but that they are essential for success in their careers. Conversely, the competencies with the lowest RDS were "Demonstrates strong interpersonal skills that are considerate, sensitive, non-judgmental, supportive, adaptive and flexible" and "Demonstrates positive regard for all students, families, and professionals". While these areas still had a negative RDS, this suggests that agricultural educators regarded their competence in these areas as high in comparison to their importance. The results from objective one are listed in Table 1.

Table 1

Ranked Discrepancy Scores for Agricultural Educator's Perceived Ability and Importance of Special Education Competencies

Competency	NR	PR	TR	RDS
Knowledge of specialized instructional styles and non-traditional teaching practices and procedures.	26	3	25	-23
Facilitates the physical classroom environment that allows for flexible scheduling and transition times.	27	5	22	-22
Knowledge of instructional adaptations including alternative assignments, supplemental instruction, differential standards, and	26	5	23	-21
Implements lesson plans that are appropriate for diverse learners.	25	4	25	-21
Increases participation of students with special needs in general education settings or community settings.	26	6	22	-20
Promotes high level integrity, competence, ethics, and professional judgment.	24	5	25	-19
Selects, adapts, or modifies core curriculum to make it accessible for all students.	22	4	28	-18
Facilitates positive self-image of students	22	6	26	-16
Facilitates active participation in a fair and respectful environment that reflects cultural diversity.	18	4	32	-14
Knowledge of procedures and regulations for reporting child abuse and the legal rights and responsibilities of teachers and students.	20	6	28	-14
Knowledge of general education assessment procedures.	18	6	30	-12
Knowledge of interpersonal skills that work effectively with adults who have different styles.	17	6	31	-11
Demonstrates strong interpersonal skills that are considerate, sensitive, non-judgmental, supportive, adaptive, and flexible.	14	4	36	-10
Demonstrates positive regard for all students, families, and professionals.	14	5	35	-9

Note. NR = Negative Ratings; PR = Positive Ratings; TR = Tied Ratings; RDS = Ranked Discrepancy Score. The retention of partial responses causes the *n* to vary within the analysis.

Conclusions, Discussions, and Recommendations

Of the 14 special education competencies that teachers were asked to rank, there was little variation in the importance with a mean variance of only .27 and standard deviation of .66. In the analysis, only 3 to 6 teachers in any category had a positive rating of their ability to deliver a competency as compared to their perceived importance of the competency. In addition, between 40.7% and 66.7% of the teachers ranked the value of the skill as equal to their ability to apply it in their professional practice. Overall, all competencies had a negative RDS, indicating that the educators believed that their ability to deliver was not at a level needed for quality instruction of the competency. These results are consistent with other studies on special education integration into agricultural education. Wilkins-Brittain et al. (2022) found that "…two teachers stated they were not given access to their students' IEPs and other teachers mentioned they did not review the IEPs of their students" (p. 10). Furthermore, 96% of students with special needs take at least one CTE course at the secondary level (Wagner et al., 2016). A lack of confidence to integrate special education into agricultural education could lead to inadequate differentiation and accommodations for agricultural education students with special needs (Aschenbrener et al., 2010; Easterly & Myers, 2011; Johnson et al., 2012; Ramage et al., 2021; Ramage et al., 2022; Wilkins-Brittain et al., 2022).

Overall, teachers rated their interpersonal skills such as inclusion of students in a positive atmosphere and working with adults effectively higher than the other assessed skills. Even with the competencies that teachers were more confident in their ability, there was still a negative RDS. This suggests that teachers realize the value of working with special education students and value the competencies developed for working with this population, but overall believe that their skill set for success is lower than needed. What is most concerning is that the greatest discrepancy scores were in the areas of instructional styles, non-traditional teaching methods, physical classroom environment, and instructional differentiation and modification. These are core competencies for success in the special education classroom. This trend in self-reported ability is strengthened by Griffing et al. (2010) which found that 23.1% of agricultural educators disagreed that their courses are an appropriate placement for students with special needs. This lack of acceptance of special needs agricultural education students could stem from their deficiency in ability to properly differentiate instruction and provide the necessary accommodations.

Agricultural education administrators and teacher educators need to evaluate both in-service and pre-service education being offered for delivering instruction to special needs populations. As the profession moves forward, research is needed for the best strategies to deliver agricultural education instruction to special needs populations. Ramage et al. (2022) suggested that agricultural educators feel that the professional development they have attended on special education was not relevant to agricultural educators and that professional development targeted for agricultural educators would be beneficial to their ability to accommodate students with special needs. Additionally, Ramage et al (2022) suggested that the professional development provided to agricultural educators should be specific by disability types including cognitive, physical, mental, etc. Furthermore, it is recommended that the benefits of SBAE and CTE are highlighted in the professional development provided to improve the acceptance of students with disabilities in the classroom by agricultural educators.

References

Aschenbrener, M. S., Garton, B. L., & Ross, A. L. (2010). Early career agriculture teachers' efficacy toward teaching students with special needs. *Journal of Agricultural Education*, *51*(4), 105–117. http://dx.doi.org/10.5032/jae.2010.04105

Becker, G. S. (1993). Nobel lecture: The economic way of looking at behavior. *Journal of Political Economy, 101*(3), 385–409. http://dx.doi.org/10.1086/261880

Borich, G. D. (1980). A needs assessment model for conducting follow-up studies. *Journal of Teacher Education, 31*(3), 39–42. https://doi.org/10.1177/002248718003100310

Boyle, J. R., & Weishaar, M. E. (2001). *Special education law with cases*. Pearson College Division. Allyn & Bacon.

Dingle, M., Falvey, M. A., Givner, C. C., Haager, D. (2004). Essential special and general education teacher competencies for preparing teachers for inclusive settings. *Issues in Teacher Education*, *13*(1), 35-50.

Easterly, R. G., & Myers, B. E. (2011). Inquiry–based instruction for students with special needs in school based agricultural education. *Journal of Agricultural Education, 52*(2), 36-46. http://dx.doi.org/10.5032/jae.2011.02036

Giffing, M. D., Warnick, B., Tarpley, R. S., & Williams, N. A. (2010). Perceptions of agriculture teachers toward including students with disabilities. *Journal of Agricultural Education*, *51*(2), 102–114. https://doi.org/10.5032/jae.2010.02102

Gliem, J. A & Gliem, R. R. (2003). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales.* Midwest Research to Practice Conference in Adult, Continuing, and Community Education, https://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem%20%26%20Gliem.pdf?%20sequence=1&isAllowed=y

Hill, R. (1998). What Sample Size is 'Enough' in Internet Survey Research? *Interpersonal Computing and Technology: An electronic Journal for the 21st Century*, *6*(3), 1-10. http://www.emoderators.com/ipct-j/1998/n3-4/hill.hmtl

Johnson, L., Wilson, E., Flowers, J., & Croom, B. (2012). Perceptions of North Carolina high school agricultural educators regarding students with special needs participating in supervised agricultural experience and FFA activities. *Journal of Agricultural Education, 53*(4), 41-54. http://dx.doi.org/10.5032/jae.2012.04041

Katsiyannis, A., Yell, M. L., & Bradley, R. (2001). Reflections on the 25th anniversary of the individuals with disabilities education act. *Remedial and Special Education*, *22*(6), 324–334. https://doi.org/10.1177/074193250102200602

Levesque, K. (2003). *Public high school graduates who participated in vocational-technical education: 1982–1998*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES 2003– 024). https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2003024

Lindner, J. R., Murphy, T. H., & Briers, G. E. (2001). Handling nonresponse in social science research. *Journal of Agricultural Education, 42*(4), 43–53. https://doi.org/10.5032/jae.2001.04043

Murdick, N. L., Gartin, B. L., & Crabtree, T. B. (2002). *Special education law*. Pearson Education, Inc.

Narine, L., & Harder, A. (2021) Comparing the Borich model with the ranked discrepancy model for competency assessment: A novel approach. *Advancements in Agricultural Development, 2*(1), 96–111. https://doi.org/10.37433/aad.v2i3.169

Needham, C., & Houck, E. A. (2019). The inequities of special education funding in North Carolina. *Journal of Education Finance 45*(1), 1- 22. https://www.muse.jhu.edu/article/747802.

Ramage, R., Roberts, R., & Stair, K. S. (2021). Accommodating students with exceptionalities in secondary agricultural education: Experiences during student teaching. *Journal of Agricultural Education, 62*(4), 207-220. https://doi.org/10.5032/jae.2021.04203

Ramage, R., Stair, K. S., Roberts, R., & Blackburn, J. J. (2022). Female agriculture teachers' lived experiences and perceived professional development needs when teaching students with special needs. *Journal of Agricultural Education, 63*(4), 105-118. https://doi.org/10.5032/jae.2022.04105

Theobald, R. J., Goldhaber, D. D., Gratz, T. M., & Holden, K. L. (2019). Career and technical education, inclusion, and postsecondary outcomes for students with learning disabilities. *Journal of learning disabilities, 52*(2), 109–119. https://doi.org/10.1177/0022219418775121

Treder, D. W., Morse, W. C., & Ferron, J. M. (2000). The relationship between teacher effectiveness and teacher attitudes toward issues related to inclusion. *Teacher Education and Special Education Journal, 23*(3), 202-210. https://doi.org/10.1177/088840640002300303

Wagner, M. M., Newman, L. A., & Javitz, H. S. (2016). The benefits of high school career and technical education (CTE) for youth with learning disabilities. *Journal of learning disabilities, 49*(6), 658- 670. https://doi.org/10.1177/0022219415574774

Wilkins-Brittain, T., Smalley, S. W., & Hainline, M. S. (2022). Describing the inclusiveness of students with disabilities in Iowa school-based agricultural education programs. *Journal of Agricultural Education, 63*(3), 1-15. https://doi.org/10.5032/jae.2022.03001

Exploring the Mid-Range Impacts of an Agriculture-Based Study Abroad Program

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Introduction and Purpose

Today, study abroad programs have become a common-place practice for many universities across the United States (Faupel, 2021). These programs and experiences impact students' lives in a multitude of ways including acquiring skills that impact students' career path, preparing students for graduate school, increasing cultural competence and curiosity, and increasing commitment to foreign language skills (Sorenson, 2017). However, from published studies that have explored longitudinal impacts of study-abroad experiences, none have had an emphasis on students within agricultural degree programs (Franklin, 2010). In contrast, studies conducted to determine impacts on agricultural students lacked an emphasis on longitudinal impacts (Pigg et al., 2020; Zhai & Scheer, 2002; O'Malley et al., 2019). In this study, we seek to understand the mid-range impacts of an agricultural-based study abroad program on participants.

Conceptual Framework and Literature Review

The conceptual framework used to frame this study was adapted from the International Education of Students Abroad Model Assessment Program's longitudinal alumni studies (Dwyer, 2004; IES Alumni, n.d.) in which data were collected from a large-scale longitudinal survey in 2002 from 50 years of study abroad participants (n = 3,723). The findings highlighted four beneficial outcomes of study abroad programs on participants: personal development, intercultural development, intellectual development, and professional development (Dwyer, 2004; Garner, 2018). These four types of development served as the framework for this study.

Personal development factors, such as maturity and self-confidence are widely cited as impacts of study abroad programs (Garner, 2018). Students develop personal autonomy, emotional resilience, flexibility, and openness as a result of study abroad experiences (Maharaja, 2018). Studies also show students develop intercultural skills through study abroad experiences by gaining an understanding of their own cultural values and developing intercultural competence and cultural intelligence (Alexander et al., 2022; Deardorff, 2006; Tarchi & Surian, 2022). Study abroad experiences of any length have been shown to increase intellectual development among participants, including increased interest in academic studies, lifelong learning, graduate school, and subsequent learning within their degree programs (McKeown, 2009; Norris & Steinberg, 2008). Study abroad opportunities can also have positive impacts on the professional development of participants by helping participants understand the importance of their professional work, increasing career placement rates, and expanding opportunities within career fields (IES Abroad, 2023; Liu, 2019). While the literature highlights areas of student development as a result of study abroad participation, little is known about mid-range impacts

from agriculture-based study abroad programs. Findings can provide insights and justification for post-secondary agriculture-based study abroad experiences.

Methods

This qualitative research study utilized an illustrative case study design approach (Stake, 2008). We were interested in examining the "what" of this case (Stake, 1995), specifically: what are the specific mid-range developmental benefits of agriculture-based study abroad experiences? This study began with the examination of the etic issue (e.g., what are the experiences of participants who participated in a study abroad program?), then, through analysis, the research question was refined to reflect the emerging emic issues to guide the remainder of the study (e.g., what are the specific long-range developmental benefits of agriculture-based study abroad experiences?).

Description of the Participants and Context: This illustrative case study involved two cohorts of former study abroad participants from 2016 and 2020 who completed the study abroad program in Puerto Rico. While Puerto Rico is a U.S. Territory, we treated it as a study abroad due to the vast differences in language, culture, agriculture, environment, and social factors from the students participating. We will refer to it as a study abroad program throughout this manuscript. Student participants in this study traveled to Puerto Rico while studying at Oregon State University (OSU) in 2016 and California State University, Chico (CSU) in 2020. Via email, we invited all former participants from the 2016 and 2020 programs to participate. A total of eight former participants from the two separate universities participated in the study. Six of the participants were from CSU while two participants were from OSU. Of the eight participants, two were male and six were female. Participants had a variety of educational focuses as students but were all agricultural majors at the time of their program expedition. Four participants majored in Agricultural Education, one in Agricultural Business, one in Agricultural Communications, and one in Crop Science. At the time of the study, participants worked in a variety of career fields including plant science, agricultural education, and agricultural business sectors. All but two participants were still involved in the agriculture industry.

The Puerto Rico study abroad program as conducted in 2016 and 2020 was open to all undergraduates irrespective of agricultural major as a non-credit learning opportunity. Through an application process, 10 participants each year were selected to participate. A lead professor and a selected student (i.e., student lead) carefully and meaningfully curated an educational learning experience with the intent to give students the opportunity to expand their knowledge in agriculture, natural resources, food, culture, religion, and everyday life in Puerto Rico. Program leaders coordinated with stakeholders in Puerto Rico to provide immersive experiences for students. Before departure, students were guided in creating personalized learning goals for the experience. These goals were to align with their educational pursuits and personal values. The development of personalized learning objectives allowed each participant to have a unique lens throughout the experience. The final itinerary for the experience was focused on Puerto Rican agriculture, cultural traditions, sustainability, and ecotourism. Both the 2016 and 2020 program itineraries were very similar. Both cohorts spent eight days and nine nights in Puerto Rico, taking tours through local farms, dairies, plantations, El Yunque National Rainforest and a bioluminescent bay. Students engaged with several local experts, farmers, educators, and

stakeholders and were immersed in Puerto Rican agriculture, culture, religion, and history. Each night, participants were asked to journal as they reflected on the day and how it aligned with their personally developed objectives.

Data Collection and Analysis: For this illustrative case study, we collected three sources of data which included a single focus group interview, followed by semi-structured one-on-one interviews with each of the participants, and the collecting and analyzing of documents such as program itineraries, example student learning goals, and field notes. The focus group and one-on-one interviews served as the main data collection point in developing the emerging themes, with documents and field notes serving as secondary data to support the core findings. Documents and field notes were saved from the 2016 and 2020 programs and analyzed to confirm identified themes. We conducted interviews in February and March of 2023. IRB approval was obtained before data collection began.

The focus group consisted of seven participants representing both cohorts and five researchers. The Zoom interview began with a general research question (etic issue) focusing on broad topics related to their study abroad experiences. We then used progressive focusing (Stake, 1995) to refine the research questions to reflect the emic issues. With a new research question guiding the study, we developed new interview questions. Based on the emerging themes found in the group interview, we developed five groups of questions for the individual interviews with a series of follow-up questions: 1) Was there a moment or experience that left an impact on you? 2) Did your perspective change as a result of this experience? If so, how is this playing out today in your life? 4) Were there any important things you learned from this experience? How are they playing out in your life today? And 5) Was there anything you learned from the Puerto Rican people? A one-on-one semi-structured interview was then conducted with a total of six participants that had expressed interest from the focus group interview to take part in the one-on-one interviews. The six interviews each lasted approximately 30 minutes via zoom.

The Zoom recordings of the one-on-one interviews were transcribed verbatim and then analyzed using a thematic analysis (Auerbach & Silverstein, 2003). Two separate researchers performed the coding process with checks for reliability and accuracy. The two lead researchers coded individually then came together to confirm the overarching themes. The initial coding yielded unanimous agreement on themes. The themes were then presented to a panel of experts. After being reviewed by the experts, five themes emerged: 1) Social - Tradition, 2) Hospitality - Community, 3) Resourcefulness - Perseverance, 4) Resources - Career Impact, and 5) Values - Community or Personal Impact.

Trustworthiness: To establish credibility, member checking and triangulation of multiple data sources were utilized and aligned (Stake, 2008). We involved the participants in checking and approving the initial findings to reduce research bias (Creswell 2013). The initial findings were used to generate one-on-one interviews. We established dependability and confirmability by using a panel of experts to guide the final theme discussion. The researchers also maintained an audit trail and a data bank to use as reference. Transferability was established by the use of thick, rich descriptions of each participant and the interview process.

Findings

This study sought to understand the mid-range impacts for agricultural students who participated in a study abroad experience. Five major themes emerged from the data: 1) Social - Traditional, 2) Hospitality - Community, 3) Resourcefulness - Perseverance, 4) Resources - Career Impact, and 5) Values - Community or Personal Impact. To maintain confidentiality, the participants in this study are represented using pseudonyms. For the sake of this study, all participants will be referred to using female pronouns.

Theme 1: Social – Tradition: Participants noted that one of the greatest impacts generated by their study abroad experience pertained to their social interactions with the people of Puerto Rico and fellow participants. Throughout the interviews, participants conveyed how these interactions broadened their worldview as well as fostered an interest and respect for perspectives different than their own. Participant 3 stated, "getting out of your comfort zone and being able to be aware of different cultures makes you a more open, curious and tolerant person." Similarly, participant 1 expressed, "when there's people coming with different backgrounds, different opinions, different perspectives, I think that's really important to be able to recognize where they're coming from." Participants noted similarities and differences in traditional social trends between the mainland United States and Puerto Rico as they related to agriculture. Participant 6 said,

> I'm an ag com major and so I'm super interested in how the public views agriculture and how the misconceptions are so present. So, there were a lot of similarities in that sense that changed my perspective just because I had no idea that the same challenges that they were facing, we are too.

Theme 2: Hospitality – Community: The hospitality and sense of community demonstrated by the people of Puerto Rico left a strong impression on participants. Participant 2 reminisced stating, "They were very humble, they were very kind, and they genuinely wanted to show us what they did." Participate 3 touched on the warm and welcoming community, affirming, "I think the ability to make anybody feel welcome is something that I learned from many of the individuals that we met in Puerto Rico." Analogously, participant 4 reflected on a farmer's invitation to his home after their tour, stating, "He invited us to his home and we ate and drank, had a merry time, and it just showed us how he embraced us in his culture... I danced with the professor's mother, the grandma. It was a good time."

Theme 3: Resourcefulness – Perseverance: Resourceful practices and persevering attitudes were observed by participants in Puerto Rico. Participants provided rich examples of ingenious agricultural applications and optimism demonstrated by agriculturists in Puerto Rico as well as how they have tried to emulate that attitude in their own lives. Referring to the disparity of resources, participant 1 stated, "I just realized, wow, we have so much technology and so much access to things that they don't and they're still making the best of it and doing a great job. They're so passionate about what they do still." Referring to how crop management processes and government regulations differ in mainland United States and Puerto Rico, participant 4 declared, "It's just crazy how there's the difference in the everyday functions of the farm. It is cool to see how they could work around that." Recognizing the technological limitations of farmers in Puerto Rico, participant 3 expressed:

> interesting to see just how they're moving towards making sure that they had sustainable food resources there on the island… (and) being able to grow your own food or take care of your own animals, to be able to provide for your family and the people there despite a large dependence on imports from the United States.

Theme 4: Resources - Career Impact: Although the Puerto Rican experience did not alter the career trajectories of the participants, it solidified their pathway in the agricultural industry and allowed them to view their occupation through a different lens. Participant 6 explained that although the trip "didn't spark anything in me that I haven't already discovered about myself," it did, however, foster, "more of a knowledge about agriculture." Participant 6 continued, "I'm very focused on that from that ag comm perspective because that's what I want to do in the future, advocate for the misconceptions of agriculture." When reflecting on how the trip impacted her perspective, participant 2 stated, "I remember going out to the pineapple farm and they did everything by hand…there were no tractors." Comparing the regulatory framework between mainland United States and Puerto Rico, participant 2 continued:

> I think California is a huge leader in agriculture in terms of environmentalists. Puerto Rico doesn't have that. Puerto Rico's like…if it's going to work and it's going to grow, this is what we're going to do. And so those things are total opposites because we in California can only use X, Y, and Z where Puerto Rico can probably use A through Z.

Theme 5: Values - Community or Personal Impact: Students' experiences in the study abroad program impacted their lives. Correspondingly, participant 5 remarked, "one thing that stuck out to me the most is how selfless [stakeholder] was to have us stay in her home and opening us up to Puerto Rico living…and actually getting a real look at culture." She continued, "I think about how generous she was to us…and it makes me want to give to others as well… teach them our side of agriculture…it definitely changed my outlook on helping others and being able to share knowledge." Participant 1 stated, "they're so passionate about what they do still…if…this was my family's operation here and we had to deal with all the problems they did. I don't know if we'd be as grateful and… have a positive outlook on things." Reflecting on her experience, participant 6 discussed her mindset, stating:

> There's so much to do in the world and there's so much to see so it's sometimes hard for me to live in the moment, take a breath, take a step back for a minute from everything and…value the relationships and the people around me that I think that they do."

Discussion and Conclusions

The findings of this study revealed five key themes of mid-range study abroad impacts. Our findings suggest that study abroad impacts have much less to do with career choice than with career enrichment. It is possible that with the focus on personalized learning goals, which tended to center around each of the students' chosen careers, the experiences were contextualized through that lens and not on career choice. While that could be plausible, these findings seem to also be supported in the literature. Other studies show study abroad experiences stimulate interest and deepen understandings within their own chosen career fields (Liu, 2019; McKeown, 2009; Norris & Steinberg, 2008). Faculty leading study abroad programs should consider this finding as they think about the purpose and goals of their own programs.

The brief study abroad experience in Puerto Rico left participants with lasting values, memories, and mottos. By their own accounts, participants have sought to apply those values to their own careers, thereby becoming more valuable assets in their respective workplaces. This study has added to the literature base by showing the mid-range impacts of an agricultural-based study abroad program where a dearth of literature existed previously. Based on our findings, study abroad experiences seem to be a productive investment for student development that has impacts well beyond the experience itself. More longitudinal research is needed to determine long-term impacts of study abroad experiences.

References

Alexander, K. C., Ingersoll, L. T., Shields, C. G., Miller, M. L., Gipson, J. A., Calahan, C. A., ... & Alexander, S. C. (2022). Cultural intelligence and short-term study abroad length: The effect of an undergraduate cultural development course and short-term study abroad program on student CQ. *Frontiers: The Interdisciplinary Journal of Study Abroad*, *34*(2), 280-301. https://doi.org/10.36366/frontiers.v34i2.567

Auerbach, C., & Silverstein, L. B. (2003). *Qualitative data: An introduction to coding and analysis*. NYU press.

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.

Deardorff, D. K. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. *Journal of Studies in International Education*, *10*(3), 241-266. https://doi.org/10.1177/1028315306287002

Dwyer, M. M. (2004). Charting the impact of studying abroad. *International Educator*, *13*(1), 14-17.

Faupel, C. (2021). *A historical analysis of U.S.-based study abroad program providers.* [Doctoral dissertation, University of South Carolina]. Scholar Commons. Retrieved from https://scholarcommons.sc.edu/etd/6301

Franklin, K. (2010). Long-term career impact and professional applicability of the study abroad experience. *Frontiers: The Interdisciplinary Journal of Study Abroad*, *19*, 169-190. Retrieved from https://files.eric.ed.gov/fulltext/EJ936414.pdf

Garner, A. E. (2018). *The impact of the Gilman Scholarship on underrepresented students studying abroad: A qualitative exploration of psychosocial outcomes* [Master's thesis, Penn State University]. Electronic Thesis and Dissertations for Graduate School. https://etda.libraries.psu.edu/catalog/15192aeg23

IES Alumni (n.d..). Alumni survey results. Retrieved from https://www.iesabroad.org/about/alumni-survey-results#50-year-alumni-survey

IES Abroad. (2023). Career outcomes of study abroad students: Survey of IES abroad alumni 2012-2015. Retrieved from https://catalogs.iesabroad.org/career-outcomes-of-study-abroad-students-2012-2015-survey/page/1

Liu, W. (2019). "Education abroad" for international student advisors: What is the impact on their professional development?. *Journal of International Students*, *9*(1), 306-319. https://doi.org/10.32674/jis.v9i1.258

Maharaja, G. (2018). The Impact of Study Abroad on College Students' Intercultural Competence and Personal Development. *International Research and Review*, *7*(2), 18-41. Retrieved from https://files.eric.ed.gov/fulltext/EJ1188735.pdf

McKeown, J. S. (2009). *The first time effect: The impact of study abroad on college student intellectual development*. Suny Press.

Norris, E. M., & Steinberg, M. (2008). Does language matter? The impact of language of instruction on study abroad outcomes. *Frontiers: The Interdisciplinary Journal of Study Abroad, 17*, 107-131. Retrieved from https://files.eric.ed.gov/fulltext/EJ899299.pdf

O'Malley, A. M., Roberts, R., Stair, K. S., & Blackburn, J. J. (2019). The forms of dissonance experienced by US university agriculture students during a study abroad to Nicaragua. *Journal of Agricultural Education*, *60*(3), 191-205. https://doi.org/10.5032/jae.2019.03191

Pigg, J., Richardson, M. A., Roberts, R., & Stair, K. S. (2020). Awakening transformative learning: A comparison of the dissonance experienced by agriculture majors during study abroad courses to Costa Rica and Thailand. *Journal of International Agricultural and Extension Education*, *27*(3), 132-147. https://doi.org/10.4148/2831-5960.1104

Sorenson, K. P. (2017). *The long-term impacts of study abroad on Oxford Eurospring alumni: A phenomenological study*. [Doctoral dissertation, University of North Dakota]. Scholarly Commons. https://commons.und.edu/theses/2352/

Stake, R. E. (1995). *The art of the case study*. Sage Publications.

Stake, R. E. (2008). Qualitative case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 119–149). Sage Publications, Inc.

Tarchi, C., & Surian, A. (2022). Promoting intercultural competence in study abroad students. *European Journal of Psychology of Education*, 37, 123-140. https://doi.org/10.1007/s10212-021-00554-0

Zhai, L., & Scheer, S. D. (2002). Influence of international study abroad programs on agricultural college students. *Journal of International Agricultural and Extension Education*, *9*(3), 23-29. https://doi.org/10.5191/jiaee.2002.09303

"I Can….": Evaluating Students' Approach to Understanding Cultural Competency through Study Abroad and Reflective Journaling

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Introduction

An estimated 325,339 college students studied abroad in the 2015/2016 academic year (U.S. State Department, 2016). 2017-2018 academic year estimates show 341,751 U.S. students studied abroad for academic credit (Institute of International Education, 2019). Therefore, the number of students participating in education abroad across the United States is experiencing growth. Students majoring in agriculture, engineering, math, and biological or life sciences represent 25 percent of all U.S. college students who study abroad yearly, with most experiences lasting eight weeks or less (U.S. State Department, 2016). While Covid-19 impacted the number of students participating in study-abroad programs (IIE, 2020), the number of programs and student interest are on the rebound.

Leadership development and education has been highlighted as an area of need by various entities, including government, education, corporation, organization, and more (Stripling & Ricketts, 2016; Chrislip & Larson, 1994). This is even more critical globally when there is a need for skills such as cultural competency, communication, and teamwork to build a more culturally aware workforce (Collins, 2001; Cohen, 2010). Leadership education combined with study abroad (SA) experiences is a powerful combination to build on students' skills and leadership potential (Montgomery & Arensdorf, 2012).

Experiential learning (EL) considers human learning in how instructional strategies are designed to meet learner needs and preferences (Tulbure & Orbori, 2014). This practice allows learners to interact in an authentic environment leading to knowledge acquisition (Bell et al., 2013). SA experiences are a high-impact pedagogical tool (Ruth et al., 2019) and have been shown to benefit the participants positively (Chrislip & Larson, 1994). These experiences allow students to grow their cultural competency, leadership abilities, and education through unique EL opportunities (Stripling & Ricketts, 2016; Chrislip & Larson, 1994). SA experiences have provided college students with unique cultural opportunities for personal growth (Earnest, 2003).

In the summer of 2022, Texas Tech University students traveled to Spain. The students spent one month in the country. They participated in a wide range of activities, including but not limited to classroom instruction, reflective journaling, personal leadership development philosophy plans, homestays with native Spain residents, service learning with a nonprofit focused on serving the blind and visually impaired community, and cultural exchanges. This study examined the impact of reflective journaling and service learning among college students participating in a short-term study abroad experience.

Theoretical Framework

Cultural competency can be defined as congruent behaviors, attitudes, and policies that form together in a system (Cross et al., 1989). The work of Cross and colleagues (1989) found five essential elements that contribute to an individual's understanding of cultural competency in systems: (a) valuing diversity; (b) having the capacity for cultural self-assessment; (c) being

conscious of inherent dynamics when cultures interact; (d) having institutionalized cultural knowledge; and (e) having developed adaptations to service delivery reflecting an understanding of cultural diversity. An expansion of this research includes three general areas included within cultural competency: cultural awareness and beliefs (being sensitive to your personal values and biases and how they influence behavior), cultural knowledge (related to culture, worldviews, and expectations or relationships), and having cultural skills ability to interact in a manner that is culturally sensitive and relevant (Sue et al., 1996). The notion of cultural competency guided this study to understand how students interacted across systems, countries, and various spaces.

Purpose & Objectives

This study examined the transference of cultural competency behaviors through reflective journaling and service learning in an agricultural leadership SA course. This study aims to better understand a student's journey along cultural competency, analyzing service-learning impacts and reflective journaling on a short-term SA experience. Through this study, learners will understand the process of adapting reflective journals and service learning experiences for use in SA experiences. In addition, learners can evaluate using these combined instructional strategies on their SA trips. The guiding question for this study was: How do reflective journaling and service learning impact a student's experience in a study abroad program?

Methods

Student's reflective journals were used as a research tool to evaluate the affective and cognitive connections and experiences of students taking a leadership course while on a SA experience. Student participants were given journals to record their own observations while visiting Spain. The reflective journals were collected at the end of the experience, de-identified using an assigned alias, copied, and returned to the students. This phenomenological study used journals to capture the student experience and progression through cultural competency, service-learning, and the content from a leadership course while on a SA experience. Reflective journaling has been demonstrated as a recommended form of capturing lived experiences during an interpretive phenomenological inquiry (Frechette et al., 2020). While the method is like content analysis in document analysis, the hermeneutic research pays attention to the participant's emotions and moods while experiencing study abroad, thus aligning more with a phenomenological approach (Giacomini et al., 2000). Previous studies have used reflective journals to record participant experiences in their natural contexts (Hayman et al., 2012). The reflective questions were based on models of cultural competency explained in the theoretical framework (Cross et al., 1989; Sue et al., 1996).

The research team reviewed the de-identified journals to analyze the data independently. The researchers conducted an inductive thematic analysis for the natural emersion of codes and themes. Open coding allowed researchers to break the narrative into separate parts; axial coding allowed the researchers to find connections between codes, and selective coding aided in connecting codes (Williams & Moser, 2019). An audit trail was created by detailing theme formation and definitions. The research team met to debrief the audit trail and theme formation for consistency, which improved the confirmability and dependability of the results (MacQueen et al., 1998). Coding allowed researchers to examine themes and more extensive connections across the phenomenological experience.

Results & Findings

Eleven journals were used to compile the results and findings for this study. The research team found 219 individual codes from the coding process. These expanded across the entire study abroad experience for students and naturally formed three emerging themes related to student connections to cultural competency, including Connected Course Content, Inclusive Leadership Principles, and Perceived Outcomes of Study Abroad. Table 1 breaks down these themes with codes and evidence from the student journals during the study abroad experience.

Table 1.
Emerging Themes

Findings/ Themes	Description of Thematic Composure
Connected Course Content	Content Communication Growth vs. fixed mindset Navigating conflict Empathy Active Listening Leadership processing Cognition of Values Identity Development Perceptions of What's Important Diversity Sensitivity to Learned Lessons Reflection Connect to personal feelings and emotions Reflected views by the U.S./ about the U.S. Therapeutic and balanced mental processing Cultural Competency Processing Service Learning Practice makes Professionals Recognizing the value of experiences Meeting personal challenges and biases Development of interpersonal skills
Inclusive Leadership Principles	Recognition that being an inclusive leader (IL) is difficult Empathy required Self-identification Recognition that abilities are ever-growing Must understand new environments Help others be comfortable Intentionality Understanding different experiences mean different perspectives Requires time and effort

	Creates a productive environment Adaptability Authenticity
Outcomes of Study Abroad	Proud of who I have become Stepping outside of comfort zone I can _____. (Students reflected on numerous skills and behaviors here) Increased confidence Being informed equals being open-minded Studying abroad is not a vacation Language ability improvement/ Language barriers Ambiguity in a new country Appreciation of art, history, and food Community is important Independence Increased identity development Impacted worldviews and understanding of the world

Coding also showed evidence to support the importance of understanding cultures across communities, food as culture, and essential skills required for understanding cultural competency. However, these findings were collapsed into three main themes: the students' experiences, reflections, and thoughts. The journals were rich descriptions of student perspectives and the processing of culture and experiences.

The Connected Course Content theme helps educators understand the relevant pieces of instructional strategies that resonated with students in the experience. While the participants described many activities, only repeated content and activities were included in the theme. General content, understanding of values (in yourself and others), reflective journaling, and service-learning experience were all critical to the students and their processing. Dorothy stated, "Adapting to a new language and to how we worked with individuals with disabilities was one of the hardest things I have ever done, but it is one of the memories that I will take with me forever."

Each student indicated the importance of understanding your form of inclusive leadership and how vital it is to process cultural understanding and competency. Students indicated many skills that comprise inclusive leadership, many of which begin internally and converge into how leaders understand others. Stan wrote, "Everyone should be an inclusive leader. I have come to the realization that I am not doing enough." Blanche added, "Just because I do not discriminate or degrade people doesn't mean I'm inclusive."

The third theme focused on the Outcomes of Study Abroad. While these experiences were highly individual, there was some shared sentiment across the journals. The utmost response was the idea of personal pride. Students reported being proud of who they had become and how they had navigated a foreign country. Many students used the phrase "I can….". This became clear that their list of interpersonal skills, behaviors, and abilities had developed while in the country, and they were aware of these changes. Many reflected on language as a key to understanding and being present in understanding a culture. Rose stated, "You never truly know what a culture is like until you live in it."

Conclusions

These themes capture the varied and similar experiences of the students who attended a short-term study abroad in Spain. As instructors, we can see the value of reflective journaling in the cognitive processing of students experiencing study abroad (Montgomery & Arensdorf, 2012). In addition, we see the development of self that occurs through skill development and developing a sense of pride in your own abilities and experiences that shape a developing worldview. These findings also indicate the importance of unique experiences that help students practically apply what they are learning in the classroom. In this instance, service learning was a great conductor of personal development. Still, it also helped students better understand cultural competency by experiencing others' worldviews within systems of social relationships and understanding the experiences of those individuals who were blind or visually impaired. Planning and inclusive pedagogy are essential to helping students make connections in a study abroad experience. In addition, cultural competence understanding comes in many forms and is not always described precisely as the guiding models and frameworks indicate the evolution.

Implications

It is essential for agricultural educators who lead study abroad opportunities to focus on the experiences and instructional strategies used to help their students in the learning process during study abroad programs. It was clear that experiential activities, including service learning and reflective journaling, were essential in a student's personal growth and learning during their study abroad experience (Montgomery & Arensdorf, 2012). In-person experiences, such as working with a non-profit organization in Sevilla, Spain, significantly impacted participants' experience leading to increased cultural awareness and personal growth. These experiences allow students to process course content and create a living laboratory to experiment with their understanding of culture and place and learn more about their navigation of cultural competency.

Recommendations

Future practice should include reflective journaling and service learning in SA programs hosted by colleges and universities. Program leaders should identify in-country opportunities for students to work alongside local community members. Researchers recommend collaborating with local partners, such as non-profit organizations, to host service-learning activities. Further research needs to be conducted on the power of reflection by college students on SA experiences. While this study demonstrates you can garner the affective and personal reactions to cultural competency and experiences, more study needs to be conducted on the detailed connection between the stages of cultural competency and progression simultaneously by students.

References

Bashan, B., & Holsblat, R. (2017). Reflective journals as a research tool: The case of student teachers' development of teamwork. Cogent Education, 4(1), 1374234.

Chrislip, D. D., & Larson, C. E. (1994). Collaborative leadership: How citizens and civic leaders can make a difference. San Francisco, CA: Jossey-Bass.

Cohen, S. L. (2010). Effective global leadership requires a global mindset. Industrial and Commercial Training, 42(1), 3–10.

Collins, D. B. (2001). Organizational performance: The future focus of leadership development programs. Journal of Leadership Studies, 7(4), 43–54. DOI: https://doi.org/10.1177/107179190100700404

Cross, T., Bazron, B., Dennis, K., & Isaacs, M., (1989). *Towards a culturally competent system of care, Volume I.* Washington, DC: Georgetown University Child Development Center, CASSP Technical Assistance Center.

Earnest, G. W. (2003). Study Abroad: A powerful new approach for developing leadership Capacities. *Journal of Leadership Education*, *2*(2).

Frechette, J., Bitzas, V., Aubry, M., Kilpatrick, K., & Lavoie-Tremblay, M. (2020). Capturing lived experience: Methodological considerations for interpretive phenomenological inquiry. *International Journal of Qualitative Methods*, *19*, 1609406920907254.

Giacomini, M. K., Cook, D. J., Evidence-Based Medicine Working Group, & Evidence-Based Medicine Working Group. (2000). Users' guides to the medical literature: XXIII. Qualitative research in health care A. Are the results of the study valid?. *Jama*, *284*(3), 357-362.

Guthrie, K. L., & Jones, T. B. (2012). Teaching and learning: Using experiential learning and reflection for leadership education. *New Directions for Student Services, 2012*(140), 53–63. https://doi.org/10.1002/ss.20031

Hayman, B., Wilkes, L., & Jackson, D. (2012). Journaling: Identification of challenges and reflection on strategies. Nurse researcher, 19(3). DOI: 10.7748/nr2012.04.19.3.27.c9056

IIE, Institute of International Education. (2020). Internationalizing the campus at home. https://www.iie.org/en/Research-and-Insights/Publications/Internationalizing theCampus-at-Home

Montgomery, J. F., & Arensdorf, J. (2012). Preparing globally competent leaders through innovative study abroad experiences. Journal of Leadership Studies, 6(1), 64–71. https://doi.org/10.1002/jls.21230

Moore, L. L., Boyd, B. L., Rosser, M. H., & Elbert, C. (2009). Developing an international agricultural leadership program to meet the needs of a global community. Journal of Leadership Education, 8(1), 118–129. DOI:10.12806/V8/I1/IB2

Ruth, A., Brewis, A., Blasco, D., & Wutich, A. (2019). Long-term benefits of short-term research-integrated study abroad. *Journal of Studies in International Education*, *23*(2), 265–280.

Stripling C.T, Ricketts J. C. (2016). Research priority 3: Sufficient scientific and professional workforce that addresses the challenges of the 21st century. In Roberts, T. G., Harder, A., & Brashears, M. T. (Eds.), American Association for Agricultural Education national research agenda: 2016-2020. Department of Agricultural Education and Communication – - University of Florida.

United States Department of State (2016). Study abroad data. https://studyabroad.state.gov/value-study-abroad/study-abroad-data. Accessed April 19, 2023.

Wei Zhang, & Brundrett, M. (2010). School leaders' perspectives on leadership learning: The case for informal and experiential learning. *Management in Education*, *24*(4), 154–158. https://doi.org/10.1177/0892020610376792

Expectations vs. Realities: An Examination of Stated Workforce Development Skills in the Agricultural Industry

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Introduction and Literature Review

The food, agriculture, natural resources, and human sciences workforce continues to expand and diversify, therefore, increasing the demand for capable and competent graduates with skills and experiences beyond discipline-specific knowledge (AGree, 2012). It is the role of agricultural education, communications, and leadership educators to develop the workforce of tomorrow for an ever expanding and growing industry.

Previous studies state the disconnect between expectations in the agricultural workforce vs the reality of the job postings (Fausti et al., 2021; Giebler, 2022; Grant, 1988; Raju & Banerjee, 2017). Goldin (2015) described workforce development as the process of preparing, educating, training, and enabling workforce development to become employed. The inability for companies and job listings to provide clear job descriptions can result in constraining the ability of qualified individuals from being recruited to proper jobs (Fausti et al., 2021). While we see a continuous job growth in the agricultural industry, we also see a gap in recent graduates not being equipped to fill those roles. However, due to a lack of clarity within job descriptions, educators are not aware of the workforce skills being sought out by industry professionals (Giebler, 2022).

For years, studies have shown several skills that are being asked for by industry professionals. Some of these skills have included communication, critical thinking, and problem solving (Swafford, 2018). Leadership skills continue to be highly valued by employers (AACU, 2015; NACE, 2021). This analysis allowed the research team to take note of studies indicating what workforce development gaps exist for agricultural graduates (Crawford & Fink, 2020a) and a better understanding of the current state of agricultural job postings.

Theoretical Framework

A 2020 report by the Association of Public & Land-Grant Universities (APLU) shared leadership skills are critical to FANH employers (Crawford & Fink, 2020a; Crawford & Fink, 2020b; Crawford, 2020c). In the context of agricultural college graduates, the APLU reports identified gaps between undergraduate preparation and the importance employers place on certain key skills (Crawford & Fink, 2020a). The report highlighted 11 skill gaps, including (a) navigating change and ambiguity; (b) recognizing and dealing with conflict; (c) realizing the effects of decisions; (d) building professional relationships; (e) identifying and analyzing problems; (f) communicating accurately and concisely; (g) accept critique and direction in the workplace; (h) understanding role and having realistic career expectations; (i) transfer knowledge across situations; (j) listening effectively; and (k) asking good questions (Crawford & Fink, 2020a).

In addition, Hendrix and Morrison (2018) sought to examine agricultural student perspectives on their personal competence related to skills crucial to workforce development. These skills included: (a) effective communications skills, both oral and written; (b) how to handle controversial issues with tact and professional manner; (c) excellent communications and

math skills; (d) ability to read and follow written and oral instructions; (e) ability to read and write very well; (f) communicate with coworkers and public; (g) teamwork, cooperation and attitude; (h) friendly and outgoing; (i) thoughtful and passionate; (j) time management and organization; (k) flexibility and adaptability; (l) working independently and/or without supervision; (m) meeting customer needs; (n) learning on the job; (o) personal integrity and responsibility; (p) organize large amounts of information; (q) learn, implement, and teach new protocols; and (r) work independently as well as be a team player (Hendrix & Morrison, 2018).

Purpose(s) & Objective(s)

The agricultural industry requires a prepared and skilled workforce to address the complex problems happening in the industry currently and in the future. The purpose of this study is to identify and evaluate the workforce development skills being sought by the agricultural industry through an analysis of agricultural job postings and descriptions.

Methods/ Procedures

This study examines the workforce skills listed in job descriptions by agricultural industry and companies through a quantitative content analysis (Fink, 2009). A content analysis is a research method that follows the scientific method (including reliability and validity) and is a summarizing form of quantitative analysis (Neuendorf, 2016). A codebook and codesheet were developed (Fonteyn et al., 2008) using identified skills from the APLU study (Crawford & Fink, 2020a; 2020b; 2020c) and Hendrix and Morrison (2018). Through an analysis of 102 job postings, this study was structured through an examination of 29 workforce development skills. These job postings were gathered from popular career websites: LinkedIn (16 listings), AgCareers (36 listings), and Indeed (50 listings).

A pilot study was conducted to provide reliability in coding and to serve as a field test. Cohen's Kappa (Cohen, 1960; Fleiss, 1971) was used to find intercoder reliability among two coders among five sample job postings gathered from AgCareers.com. After running Cohen's Kappa for intercoder reliability (range .68 to .94), it was determined that criteria should be added to the codesheet to include listing city, DEI initiatives, and position level (full-time, part-time, etc.) as researchers made personal notes about their presence. Manual coding was used in this analysis. Through a content analysis, the potential for research bias in the coding process of the evaluated postings is reduced (Insch et al., 1997). As the job postings were being evaluated, the identified skills were categorized into "not stated at all", "vaguely stated", or "clearly stated" columns. As previous work that had taken this approach, the team identified clear ways of describing the three variables associated with how effectively the skills were stated. Skills were identified as "clearly stated" when using direct terminology associated with the workforce skills, "vaguely stated" when a synonym or related phrase was used to describe the skill, and "not stated at all" when there was no mention of the workforce skill. To evaluate the job postings, researchers read the descriptions and evaluated the presence of the skill variables.

The population included a total of 102 job postings amongst AgCareers, LinkedIn, and Indeed. All 102 postings were founded on several qualifications. Each site was marked with the distinctions of "full time", "entry level", within the "United States' ', and "agriculture". To maintain consistency amongst all three career websites, every fifth job was pulled and coded. It is also vital to note missing data within the table, as some of the skills were not tallied in the

individual job posting. In addition to these variables among the codesheet, salary information, agricultural sector, and position location were also coded.

Results/ Findings

Most workforce skills were identified within the "not stated at all" category. Table 1 provides a breakdown of the APLU (2020) workforce skills by percentage. The highest percentage of skills stated within job descriptions was "Understand role, realistic career expectations." This appeared in the job descriptions as detailed lists of objectives and tasks: "Develop protocol for the execution of program-specific replicable fundraising events or campaigns (by 1/15/2023)". A lack of detail within these job postings that would call for the most "equipped" individual to fill the role being asked for (Fausti et al., 2018; Fausti et al., 2021; Giebler, 2022; Raju & Banerjee, 2017; Royer, 2010).

Table 1

Breakdown of APLU (2020) Workforce Skills By Percentage (N=102)

Skills	Clearly Stated	Vaguely Stated	Not Stated At All
Recognize & deal constructively with conflict	2.9%	5.9%	87.3%
Build professional relationships	15.7%	35.3%	47.1%
Accept critique and direction in the workplace	4.9%	18.6%	73.5%
Understand role, realistic career expectations	39.2%	45.1%	11.8%
Deal effectively with ambiguity & navigate change	3.9%	0.9%	90.2%
Identify and analyze problems	20.6%	23.5%	51.9%
Realize the effect of decisions	4.9%	30.4%	60.8%
Transfer knowledge across situations	4.9%	38.2%	53.9%
Listen effectively	2.9%	1.9%	92.2%
Communicate accurately and concisely	7.8%	39.2%	50.0%
Ask good questions	-	1.9%	94.1 %

Note: Missing Data (n=5)(n=4)(n=3)(n=2)

Table 2 indicates the percentages reflected by using the list of workforce development skills presented by Hendrix and Morrison (2018). 'Effective communication skills, both oral and written" was the most clearly stated skill variable at 30.4%. The least stated variable was

"Handle controversial issues with tact and a professional manner" at 0.9% and "ability to read and write very well" which was never stated clearly.

Table 2
Breakdown of Hendrix & Morrison (2018) Workforce Skills by Percentage (N=102)

Skills	Clearly Stated	Vaguely Stated	Not Stated at All
Effective communication skills, both oral & written	30.4%	7.5%	57.8%
Handle controversial issues with tact and a professional manner	0.9%	5.9%	90.2%
Excellent communications and math skills	3.9%	17.6%	75.5%
Ability to read & follow written & oral instructions	5.9%	4.9%	85.3%
Ability to read and write very well	-	4.9%	91.2%
Communicate with coworkers and public	18.6%	40.2%	38.2%
Teamwork, cooperation, attitude	15.7%	27.5%	53.9%
Friendly and outgoing	1.9%	3.9%	90.2%
Thoughtful and passionate	12.7%	10.8%	72.5%
Time management and organization	15.7%	26.5%	54.9%
Flexibility and adaptability	16.7%	23.5%	56.9%
Working independently and/or without supervision	14.7%	14.7%	67.6%
Meeting customer needs	16.7%	12.7%	69.6%
Learning on the job	9.8%	7.8%	79.4%

Personal integrity and responsibility	7.8%	50.9%	37.3%
Organize large amounts of information	1.9%	49.0%	46.1%
Learn, implement, teach new protocols	13.7%	27.5%	54.9%
Work independently as well as be a team player	14.7%	18.6%	63.7%

Note: Missing Data (n=5)(n=4)(n=3)(n=2)

In regard to salary, the majority of the job postings fall into the category of "not clearly stated". This maintains the trend with the statement of a lack of detail within postings. While various job listings did note a range, there several were listed as "based on experience" or "competitive rates". With 11 different categories, most postings fell into one of five categories: agribusiness/economics (40.2%), social sciences/human services (39.2%), animal sciences (28.4%), plant & soil sciences/horticulture (28.4%), and/or production/farming (34.3%). All 102 job postings were marked as full time and entry level.

Conclusions/ Recommendations/ Implications

With more than half of the workforce skills being not stated in the job descriptions, there is an urgency on behalf of industry professionals to fill those gaps. This supports prior research that indicated similar results over a decade ago (Royer, 2010). In 2019, 22.2 million U.S. jobs were accounted for being within the agriculture industry (Kassel & Martin, 2020). With a growing rate of jobs comes a need for qualified college graduates to step into those roles. For decades, studies have continuously emphasized the importance of updating job descriptions on career websites to provide individuals seeking employment with a clear blueprint of what they should expect stepping into the job (Fausti et al., 2021; Giebler, 2022; Grant, 1988; Raju & Banerjee, 2017). However, skills, such as "deal effectively with ambiguity & navigate change" and "handle controversial issues with tact and a professional manner", are still falling over 90% in the "not stated at all" category. Most of our findings indicate that the agricultural sector does not adequately seek or list the workforce development skills they indicate are lacking among college of agriculture graduates (Crawford & Fink, 2020a; 2020b; 2020c). If these skills are not being asked for, the lack of these skills in college of agriculture graduates is not being highlighted or addressed. In turn, this amplifies the problem and the growing deficit of workforce development skills among agricultural students when they enter the workforce. In turn, this makes it difficult to sustain the appropriate development of our agricultural social sciences students and creating opportunities for them to engage in classroom experiences that foster skill development relevant for the ag industry.

To echo prior research, there is a divergence as to what educators see as a high priority in their lessons, as compared to what industry professionals categorize as high priority. (Fausti et al., 2021). This study builds on the previous recommendation of connecting agriculture industry professionals to the conversations of leadership curriculum to maintain relevance with the industry skills needed to serve a globalized society (Morgan, 2010). The study also revealed a discrepancy within the term "experience". As job postings were evaluated based on being entry level, various postings revealed statements such as "one year experience", "required experience", and "salary based on experience". The question remains as to how educators in colleges of

agriculture can help address the skill deficit and equip college students for the jobs and roles needed to advance the agricultural industry. Additional research needs conducted among industry professionals to determine how job descriptions are written and to what end the workforce skill deficit is addressed from stating the needs of a prepared workforce to become more transparent to the students studying for these positions of the future. Further studies could examine students' perceived skill development in colleges of agriculture and the existing gaps by discipline.

References

AGree. (2012). *Facing the future: Critical challenges to food and agriculture.* http://www.foodandagpolicy.org/sites/default/files/Facing_the_Future_0.pdf

Alston, A. J., Cromartie, D., Wakefield, D., & English, C. W. (2009). The importance of employability skills as perceived by the employers of United States' land-grant college and university graduates. *Journal of Southern Agricultural Education Research, 59*(1), 59-72. ISSN: 1935-6412

American Association of Colleges and Universities [AACU]. (2015). *Falling short? College learning and career success.* Washington, DC: Hart Research Associates.

Association of Public & Land-Grant Universities. (2020, June 9). *APLU releases two reports on gaps in employability skills and workforce preparedness among college graduates*. Retrieved from https://www.aplu.org/news-and-media/news/aplu-releases-two-reports-on-gaps-in-emplyability-skills-and-workforce-preparedness-among-college-graduates/

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and psychological measurement, 20*(1), 37-46. doi: https://doi.org/10.1177/001316446002000104

Crawford, P., & Fink, W. (2020a). *From academia to the workforce: Navigating persistence, ambiguity, change, and conflict in the workplace*. Washington, DC: Association of Public and Land-grant Universities.

Crawford, P., & Fink, W. (2020b). *From academia to the workforce: Critical growth areas for students today.* Washington, DC: Association of Public and Land-grant Universities.

Crawford, P., & Fink, W. (2020c). *From academia to the workforce: Executive summary. Washington, DC: Association of Public and Land-grant Universities.*

Fausti, S. W., Erickson, B., Clay, D. E., & Clay, S. A. (2021). Is the Custom Service Industry's Role in Precision Agriculture Linked to Workforce Development?. In *Western Economics Forum*, 19(2), 68-78. doi: https://doi.org/10.22004/ag.econ.315937

Fausti, S. W., B. Erickson, S. Clay, L. Schumacher, D. Clay and D. Skouby. 2018. "Educator survey: Do institutions provide the precision agriculture education needed by agribusiness?" *Journal of Agribusiness*, 36(1): 41-63. doi: https://doi.org/10.22004/ag.econ.302474

Fink, E. L. (2009). The FAQs on data transformation. Communication Monographs, 76(4), 379-397. doi: https://doi.org/10.1080/03637750903310352.

Fonteyn, M. E., Vettese, M., Lancaster, D. R., & Bauer-Wu, S. (2008). Developing a codebook to guide content analysis of expressive writing transcripts. *Applied Nursing Research*, *21*(3), 165-168. doi: http://dx.doi.org/10.1016/j.apnr.2006.08.005

Giebler, M. (2022). *Teaching for Career Success: An Agricultural Industry Perspective of Preparedness Needs for Diverse Workforce Development* (Doctoral dissertation, University of Arkansas).

Goldin, N. (2015). Key considerations in youth workforce development. *Center for Strategic and International Studies.* Retrieved from https://csis-prod. s3. amazonaws. com/s3fspublic/legacy_files/files/publication/150129_Goldin_YouthWorkforce_Web.

Grant, P. C. (1988). Why job descriptions don't work. *Personnel Journal*.

Hendrix, R., & Morrison, C. C. (2018). Student Perceptions of Workforce Readiness in Agriculture. *Journal of Agricultural Education*, *59*(3), 213-228. doi: http://dx.doi.org/10.5032/jae.2018.03213

Insch, G. S., Moore, J. E., & Murphy, L. D. (1997). Content analysis in leadership research: Examples, procedures, and suggestions for future use. *The Leadership Quarterly*, 8(1), 1-25. doi: https://doi.org/10.1016/S1048-9843(97)90028-X

Kassel, K., & Martin, A. (2020). Ag and Food Sectors and the Economy. USDA ERS - Ag and Food Sectors and the Economy. https://www.ers.usda.gov/data-products/ag-and-foodstatistics-charting-the-essentials/ag-nd-food-sectors-and-theeconomy

Morgan, A. C. (2010). Competencies Needed by Agricultural Communication Graduates: An Industry Perspective. Journal of Applied Communications, 94(1). doi: https://doi.org/10.4148/1051-0834.1184

National Association of Colleges and Employers [NACE]. (2021a). The attributes employers seek on students' resumes. National Association of Colleges and Employers. https://www.naceweb.org/talent-acquisition/candidate-selection/the-attributes-employers-seek-on-students-resumes/

Neuendorf, K. A. (2016). The content analysis guidebook. New York: Sage. doi: https://doi.org/10.1002/9781118541555.wbiepc065.

Raju, K. K., & Banerjee, S. (2017). A study on job description and its effect on employee performance: case of some selected manufacturing organizations in the city of pune, India. *International Journal of Latest Technology in Engineering, Management &*

Applied Science (IJLTEMAS), *6*(2), 1-10. ISSN: 2278-2540

Royer, K. P. (2010). Job descriptions and job analyses in practice: How research and application differ. College of Liberal Arts & Social Sciences Theses and Dissertations. 50.

Swafford, M. (2018). STEM Education at the Nexus of the 3-Circle Model. *Journal of Agricultural education*, *59*(1), 297-315. doi: https://doi.org/10.5032/jae.2018.01297