Exploring Curriculum Congruence and Connectivity within School-Based Agricultural Education

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Abstract

Teacher connectivity represents a relatively new and exciting construct within school based agricultural education. Existing research identifying a relationship between teacher connectivity and career commitment illuminates the need for additional research on teacher connectivity within school-based agricultural education. Framed using the Relational Theory of Working, the current research analyzes four facets of teacher connectivity (i.e., connection to the community, curriculum, school, and other school-based agricultural education teachers) alongside curriculum congruence, years of teaching experience, and teacher certification type. Results illustrate, among the majority of respondents, personal interest toward an agricultural subject exceeds the presence of that topic within their program. Across all areas studied, only 17.65% of responding teachers experienced alignment between their personal interests and level of curriculum represented within their program. Furthermore, results from this investigation highlight connectivity is highest among teachers who experience congruence between the presence of their curriculum and their personal interests, teachers later in their career, and teachers traditionally certified. In concert, results highlight teacher characteristics which may predispose a teacher to struggle establishing connections within the profession. Recommendations for research and practice are framed by aligning the theoretical framework, findings, and conclusions.

Introduction

Regardless of subject, teachers face countless challenges within the classroom. In addition to classroom tasks, teachers operate in many spaces outside of the classroom, increasing their total workload and breadth of challenges faced. Responsibilities external to the classroom include working with school administrators, building relationships with parents, and planning curriculum. External expectations are certainly part of school based agricultural education (SBAE) teacher workloads. In fact, SBAE teachers log an average of 55 to 60 hours of work each week (Sorensen et al., 2016). External expectations for SBAE teachers include managing work-based learning programs, collaborating with state and local Career and Technical Education (CTE) officials, managing the local FFA chapter, and engaging with community members and businesses (Clemons & Lindner, 2019; Murray et al., 2011; Sorensen et al., 2016).

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A recent study found the connections teachers have inside and outside the classroom relate to career commitment (Moser & McKim, 2020). Connectivity has been an underlying concept among various areas of focus in SBAE, including self-efficacy, work-life balance, teacher empowerment and professionalism, job satisfaction, school culture, and emotional support (Clemons & Lindner, 2019; Hasselquist et al., 2017; McKim & Velez, 2016; Moser & McKim, 2020; Pearson & Moomaw, 2005; Rinke, 2007; Sass et al., 2011; Sorensen et al., 2016, 2017; Sorensen & McKim, 2014). Each of the aforementioned concepts intersect with teacher attrition and retention. Teacher retention continues to be a large focus in education, across all disciplines (Hong, 2010; Lawver et al., 2018; Rinke, 2007). The importance of teacher retention paired with the established relationship between career commitment and teacher connectivity, necessitates research dissecting teacher connectivity as a construct. This study seeks to expand the knowledge of teacher connectivity by exploring how teacher development experiences (i.e., teaching experience and certification type) and curriculum congruence intersect with the connectivity perceived among a national sample of SBAE teachers.

Literature Review

The current study foregrounds four critical elements: (a) teacher connectivity, (b) curriculum congruence, (c) teaching experience, and (d) teacher certification type. Therefore, the literature review synthesizes relevant literature relating to each of these areas.

Connectivity

A relatively new concept in education literature, connectivity is defined as, "the dynamic, living tissue that exists between two people at work when some interaction occurs that involves mutual awareness" (Stephens et al., 2011, p. 1). Dutton and Heaphy (2003) highlighted the importance of high-quality connections among employees as the key for organizational success and higher job satisfaction. Stephens et al. (2011) supported this finding, citing high-quality connections help to facilitate career transitions, form attachments to communities and work organizations, and provide support when seeking help for task-specific issues. Key features of a "high-quality" connection include (a) greater emotional carrying capacity (i.e., more emotion present, positive or negative), (b) resilience of the connection to bend and rebound after setbacks, and (c) the openness to new ideas and influences (i.e., degree of connectivity; Dutton and Heaphy, 2003; Stephens et al., 2011). Stephens et al. (2011) identified various aspects of connections that highlight their importance for further research, including: (a) humans are inherently social beings; (b) connections are dynamic and continually evolving based on feelings, thoughts, etc.; (c) work is typically performed through social processes; and (d) quality of connections varies.

The current research operationalizes four connectivity constructs. The first construct, school connectivity, focuses on the level of connections SBAE teachers have within their school district. Existing research indicates school connections are essential for predicting intentions to remain in the teaching profession (Moser & McKim, 2020). Additionally, school connections are related to the emotional support perceived by teachers and culture existing within the school district (Rinke, 2007; Sass et al., 2011). The next construct utilized within the current study is SBAE teacher connectivity, which foregrounds teacher perceptions of connections to other secondary agriculture teachers. SBAE teacher connectivity was also found to be a statistically significant predictor of career commitment (Moser & McKim, 2020). Studies within SBAE highlight the importance of connecting with fellow agriculture teachers, finding strong levels of connections relate to increased teacher self-efficacy (Korte & Simonsen, 2018).

The third construct for this study includes teacher connections to their current curriculum. This construct encompasses the autonomy, passion, and preparation teachers hold for their curriculum; as

autonomy and knowledge of curriculum support teacher retention (Clemons & Lindner, 2019; Kauffman et al., 2002). The final construct for this study evaluates the connections teachers have with their community. SBAE is unique in the level of community involvement, given (a) the incorporation of work-based learning, (b) the integration of community service through the National FFA Organization, and (c) the utilization of advisory boards for program oversight (Ogle, 2016).

Teacher Development Experiences and Curriculum Congruence

Research relating to the three independent variables utilized within the current study (i.e., curriculum congruence, years of teaching experience, and teacher certification type) are synthesized within this section. The first variable, curriculum congruence, details the alignment between the presence of, and interest in teaching, Agriculture, Food, and Natural Resources (AFNR) pathways or programmatic elements. The relationship between curriculum autonomy and passion for teaching is not new to education or SBAE. Autonomy with curricular planning has been linked with perceptions of job satisfaction and stress (Pearson & Moomaw, 2005). Additionally, Pearson and Moomaw (2005) state, "constraints on autonomy such as perceived lack of control and sense of powerlessness are related to tension, frustration, and anxiety among teachers" (p. 40). Heightened degrees of stress and anxiety can lead to more burnout and job dissatisfaction, leading to teachers leaving the profession (Chenevey et al., 2008; Smith & Smalley, 2018). Given the nature of autonomy and potential negative emotions, one could argue a lack of autonomy would decrease connectivity as connections are directly influenced by the emotions held by an individual at a given time (Stephens et al., 2011). Higher autonomy would allow for teachers to integrate more subject matter they are passionate about, increasing curriculum congruence.

The second variable of interest within this section is teaching experience. Given the intersectionality of connectivity with other areas of research impacted by years of experience (e.g., self-efficacy, work-family balance; McKim & Velez, 2016; Sorensen et al., 2016, 2017; Sorensen & McKim, 2014), one can assume connections are also influenced by teaching experience. Additionally, the theoretical framework for this study reaffirms that it takes time to build relationships (Blustein, 2011), suggesting early career teachers are more likely to perceive lower connectivity.

The final variable explored within this section is certification type. For the purpose of this study, alternatively certified teachers are defined as teachers who did not complete an undergraduate or graduate degree in agricultural education that included teacher certification. With over 130 alternative certification routes, candidates entering the classroom from one of these programs experience vastly different levels of preparation (National Research Council, 2010). Importantly, alternatively certified teachers experience unique challenges in the SBAE teaching profession. In a study focused on self-efficacy, alternatively certified teachers were found to be less efficacious in teaching pedagogy, program development, and managing Supervised Agricultural Experiences (SAE) and the local FFA chapter when compared to traditionally certified teachers (Duncan & Ricketts, 2006).

A common solution to the challenges faced by alternatively certified teachers is mentoring. Walsh and Jacobs (2007) found that all the certification pathways analyzed in their study had minimal mentorship or were completely absent of mentorship, which is detrimental to new teacher support. Additionally, those with a mentoring program were often not district-sponsored (i.e., the mentor was not employed within the same district), and over one-third of mentor/mentee meetings happened once a month or less (Walsh & Jacobs, 2007). Assuming this lack of mentorship is the case for many alternatively certified SBAE teachers, the lack of a mentor will negatively impact perceptions of connectivity, given that mentors are essential to developing high-quality connections (Moser & McKim, 2020). Given the intersectionality of self-efficacy and connectivity (Moser & McKim, 2020)

and the variation of alternative certification programs, certification type is an important variable in our exploration of connectivity.

Theoretical and Conceptual Framework

To fully encompass the various relationships of connectivity with the variables chosen for this study, we have outlined both a theoretical and conceptual framework. The Relational Theory of Working (RTW) informed the exploration of connectivity among four domains (i.e., school, SBAE teachers, curriculum, and community) for this study. The RTW challenges the notion that work-related decisions are not influenced by others and conceptualizes working as a relational act that influences every interaction, decision, and experience of employees (Blustein, 2011). Additionally, the RTW notes how internalization of relationships influences workplace decisions as, "…relationships shape individual functioning, and optimally, enhance resilience in both work and non-work settings" (Blustein, 2011, p. 7). Jordan (2008) supported the importance of viewing work-related literature from a relational lens as they noted individual growth cannot occur without connections to others.

From a psychological perspective, the RTW conceptualizes the outcomes of working in a new way by highlighting the relational aspects to ideal working outcomes. Blustein (2011) explains the RTW theorizes, "…optimal outcomes of working that is grounded in the belief that working, ideally, should provide some degree of meaning, matter, and dignity" (p. 4). In other words, working should be intrinsically satisfying and hold personal meaning for individuals. Social interactions and relationships directly influence one's perceptions of meaning and are foundational for this theoretical lens (Blustein, 2011; Richardson, 2011).

As noted earlier, connectivity has been an underlying concept within educational research, however, has been minimally used in such an explicit manner. This study seeks to expand the notion that relationships are essential for any workplace, including education, by exploring the relationship between connectivity and teacher development experiences (i.e., years of teaching experience, certification type).

Building upon the RTW, we developed a conceptual framework to understand the potential interaction between curriculum congruence and connectivity, a phenomenon analyzed in our second research objective. Given the lack of research between curriculum autonomy and connectivity, a conceptual framework is essential to linking these two concepts. We hypothesize that respondents with a higher curriculum congruence (i.e., more alignment between passion for and implementation of each curricular pathway) will perceive higher levels of connectivity. For ease of reading, the relationship between curriculum congruence and each domain of connectivity is outlined in Table 1.

Table 1
Curriculum Congruence and Connectivity

Information	School Connectivity	SBAE Teacher Connectivity	Curriculum Connectivity	Community Connectivity
Definition of Each Construct	Perceived connections within a school district, particularly with administrators and other content area teachers.	Perceptions of relationships with fellow SBAE teachers.	Personal connection to the curriculum taught at the time of the survey, based on autonomy, preparation, and passion for the curriculum.	Connections held with community stakeholders including businesses, parents, and alumni members.
Curriculum Congruence Relationship	Restraints of curriculum autonomy cause tension and negatively impact connections perceived with administrators and possibly other content teachers.	Teachers who feel passionate for certain subject areas will be able to connect with other SBAE teachers who share similar passions. Additionally, teachers may seek relationships to build interest and/or knowledge of certain pathways.	A teacher with higher alignment between passion for and implementation of each AFNR pathway will feel a stronger connection with their overall curriculum.	Teachers are more likely to engage in their interest areas within the community. Therefore, teachers with high curriculum congruence may find it easier to connect community members to their program.

Purpose and Objectives

The purpose of this study was to explore three variables which may influence school-based agriculture teacher connectivity. Results from this research are expected to illuminate teacher characteristics which may be more or less likely to perceive connections within the discipline. Given the importance of connectivity in relation to career commitment (Moser & McKim, 2020), this research is both timely and relevant. To achieve the established purpose, the following research objectives were developed:
1. Analyze teacher content interest and curriculum taught via a measure of curriculum congruence.
2. Explore teacher connectivity by different levels of curriculum congruence.
3. Explore teacher connectivity by years of teaching.
4. Explore teacher connectivity by teacher certification type.

Methods

The current study of curriculum congruence, years of teaching experience, certification type, and connectivity was completed using survey research methods. Data reported in this manuscript are part of a larger research project exploring connectivity among school-based agriculture teachers in the United States.

Population, Sample, and Data Collection

The study population included approximately 13,500 (approximate $N = 13,500$) school-based agricultural educators teaching at the middle school and high school level during the 2018-2019 school year. A simple random sample of 750 teachers was obtained from the National FFA Organization, which holds the most complete population frame for school-based agricultural educators. The requested sample size was computed using multiple linear regression requirements, a statistical method used in the larger research project (Moser & McKim, 2020). The sample of 750 was reduced to 705 due to frame error (e.g., bounced emails). A maximum of four emails were sent to potential respondents requesting their completion of the online survey. Email requests were sent in March and April of 2019. A total of 213 ($n = 213$) usable responses were retrieved, yielding a 30.21% response rate. Non-response bias was a potential concern given the sampling methods and response rate; therefore, on-time respondents ($n = 207$) were compared to late-respondents ($n = 30$) among the variables salient to the current study. A lack of statistical differences between on-time and late-respondents suggests non-response bias was not a concern in the current study (Lindner et al., 2001; Miller & Smith, 1983). Readers are, however, encouraged to exercise caution when interpreting the findings to the entire population of school-based agricultural educators during the 2018-2019 school year due to the limited number of responses received.

Instrumentation

The data collection instrument included four connectivity constructs (i.e., community, curriculum, school, and SBAE teachers), curriculum scales, and demographic questions. Each connectivity construct was developed by the research team leading this study. See Table 2 for a description of the four connectivity constructs.

Table 2

Description of Connectivity Constructs

Construct	Items	Example Item
Community Connectivity	5	I feel like I have many individuals within my community to reach out to help with my program.
Curricular Connectivity	7	I have a passion for the subject(s) I teach.
School Connectivity	7	Among the administrators at my school, there is support for agricultural education.
SBAE Teacher Connectivity	7	I have one of more agriculture teachers that I can count on to assist me when needed.

Note. Items within the connectivity constructs were measured on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

In addition to the connectivity constructs, respondents were presented with two curriculum scales. On these scales, respondents indicated the presence of 11 pathways or programmatic elements within their SBAE program (i.e., Agribusiness; Animal Science; Biotechnology; Environmental Science; Food Products and Processing; General Agriculture; Leadership; Natural Resources; Plant/Soil Science; Power, Structural and Processing; and SAE). Curriculum presence was rated from 0 (*Area not present in the curriculum I teach*) to 100 (*Area encompasses all the curriculum I teach*). Teachers also reported their interest in teaching each of the 11 pathways or programmatic elements on a scale from 0 (*No Interest*) to 100 (*Extremely High Interest*). Data collected from these sets of scales

were used to calculate curriculum congruence, which is conceptualized as achieving a balance between personal interest in a subject, as a teacher, and the presence of that subject within the curriculum you teach. For example, a teacher who loves caring for production animals would experience curriculum congruence if animal science was a large proportion of their curriculum. Alternatively, if a teacher disliked animals yet animal science was a large proportion of the curriculum they taught, this teacher would lack curriculum congruence.

The final section of the instrument included questions regarding respondent demographics. Demographic questions included years of teaching experience – collected as a continuous variable – and the question "did you complete a traditional agriculture teacher education program (i.e., undergraduate or graduate degree in agricultural education)" with a dichotomous response option of "yes" or "no." Both years of teaching experience (i.e., research objective three) and teacher certification type (i.e., research objective four) were used as variables within our research.

Validity and Reliability

A panel of experts was established to provide feedback on the quality of the instrument. The panel included four faculty in SBAE with expertise in research methods and instrumentation. Feedback provided by the panel included recommendations to expand the connectivity constructs. In addition to feedback provided by the panel of experts, a pilot test of the instrument was conducted with 118 business teachers in Michigan. Reliability estimates suggested four of the five constructs were reliable (i.e., Cronbach's alpha for community connectivity = .88, school connectivity = .90, disciplinary-peer teacher connectivity = .88, and career commitment = .87). The curriculum construct was not reliable in the pilot test; however, it was recommended to keep the construct for data collection as the target population differed from the pilot population in regard to teacher relationships to their curriculum. *Post hoc* reliability analyses indicated that each of the five connectivity constructs were reliable (i.e., Cronbach's alpha for community connectivity = .89, curricular connectivity= .72, school connectivity = .81, SBAE teacher connectivity = .89, and career commitment = .92) among the population of interest (Fraenkel & Wallen, 2000; Nunnally & Bernstein, 1994).

Data Analysis

For research objective one, average curriculum presence and interest were identified and reported along with standard deviation. For research objective two, a categorical measure of curriculum congruence was determined. For each of the 11 pathways or programmatic elements, presence score was compared to interest score. If their interest score exceeded their presence score by more than 10 points, they fell into the category "interest exceeds." If the presence score exceeded the interest score reported by respondents by more than 10 points, they were placed within the "presence exceeds" category for that pathway or programmatic element. If the presence and interest scores were within 10 points of each other, the teacher was placed within the "aligned" category for that pathway or programmatic element. Percentages of respondents within each of the three categories were reported for each of the 11 pathways or programmatic elements. In addition, an average presence and interest score was determined across the 11 pathways or programmatic elements, and teachers were concatenated into one of the three categories (i.e., presence exceeds, aligned, or interest exceeds) across their curriculum. These categories were utilized to complete research objective two, as the average connectivity score across the four elements of connectivity were reported for each category of teacher.

Categories for years of agriculture teaching experience were also created, including early career teachers (0 – 5 years of agriculture teaching experience), mid-career teachers (6 – 19 years of agriculture teaching experience), and late-career teachers (20 or more years of agriculture teaching experience). Average connectivity scores within the four elements of connectivity were also reported across these

three categories of agriculture teaching experience. Similarly, certification type (i.e., traditional or alternative) categories were used to complete research objective four. Average connectivity scores were reported across the two certification type categories in accordance with research objective four.

Description of Respondents

Survey respondents averaged 12.46 years (*SD* = 10.51) of agriculture teaching experience. The majority of respondents (75.10%) had completed a traditional teacher education program in agriculture. Respondents to the survey represented a total of 42 states and Puerto Rico. The most well-represented states included Texas, California, Georgia, and Kansas.

Findings

In the first research objective, curriculum taught, content interest, and curriculum congruence were explored (see Table 3). Among the programs represented by respondents, Animal Science was the most well-represented content area within the curriculum (*M* = 60.19; *SD* = 31.91) followed by General Agriculture (*M* = 58.21; *SD* = 33.07) and Leadership (*M* = 55.01; *SD* = 33.90). The three most well-represented content areas were also the three content areas in which teachers reported the most personal interest (Animal Science: *M* = 79.56, *SD* = 25.81; Leadership: *M* = 73.85, *SD* = 29.00; General Agriculture: *M* = 73.10, *SD* = 27.08).

Table 3
Curriculum Presence, Interest, and Congruence

| | Presence | | Interest | | Curriculum Congruence (%) | | |
| | M | SD | M | SD | Interest Exceeds | Aligned | Presence Exceeds |
Content Areas							
Agriculture Business	34.59	31.05	56.14	30.36	61.15	27.34	11.51
Animal Science	60.19	31.91	79.56	25.81	61.08	29.34	9.58
Biotechnology	29.19	28.51	47.86	29.39	69.89	18.28	11.83
Environmental Science	32.71	28.58	47.60	28.44	65.79	15.79	18.42
Food Products and Processing	34.80	29.27	53.46	29.67	71.93	17.54	10.53
General Agriculture	58.21	33.07	73.10	27.08	49.34	32.24	18.42
Leadership	55.01	33.90	73.85	29.00	60.00	28.48	11.52
Natural Resources	37.68	31.56	57.81	28.07	72.66	13.28	14.06
Plant and Soil Science	53.55	32.30	68.79	27.18	54.55	26.62	18.83
Power, Structure, and Technology	54.46	33.66	62.05	30.91	48.46	29.23	22.31
SAE	49.48	34.37	66.76	31.56	51.32	34.21	14.47
Overall	46.48	22.33	64.20	19.46	73.26	17.65	9.09

Note. Curriculum presence was rated from 0 (*Area not present in the curriculum I teach*) to 100 (*Area encompasses all the curriculum I teach*). Curriculum interest was rated on a scale from 0 (*No Interest*) to 100 (*Extremely High Interest*).

The discrepancy between curriculum presence and curriculum interest was used to calculate curriculum congruence. Across all content areas, 73.26% of respondents' average level of interest exceeded the average presence of the content (i.e., interest exceeds), 17.65% had similar levels of

interest and content area presence (i.e., aligned), and 9.09% reported higher levels of presence when compared to their interests (i.e., presence exceeds). The three content areas with the highest proportion of teachers in the interest exceeds category were Natural Resources (72.66%), Food Products and Processing (71.93%), and Biotechnology (69.89%). The four content areas with the highest proportion of teachers in the presence exceeds category were Power, Structure, and Technology (22.31%), Plant and Soil Science (18.83%), Environmental Science (18.42%), and General Agriculture (18.42%). The aligned category, in which level of interests closely matched curriculum presence, included the highest percentage of teachers in the SAE (34.21%), General Agriculture (32.24), and Animal Science (29.34%) content areas. Alternatively, the content areas with the lowest percentage of teachers in the aligned category included Natural Resources (13.28%), Environmental Science (15.79%), and Food Products and Processing (17.54).

In research objective two, we explored curriculum congruence and teacher connectivity (see Table 4). Looking across the four elements of connectivity, a clear pattern emerged. Specifically, teachers in the presence exceeds category reported the lowest connectivity followed by teachers in the interest exceeds category. Across all four elements of connectivity, teachers in the aligned category reported the highest level of connectivity. Among presence exceeds teachers, curriculum connectivity was the highest rated element of connectivity ($M = 5.42$, $SD = 0.78$). For teachers in the aligned category, SBAE teacher connectivity was the highest rated element of connectivity ($M = 5.67$, $SD = 1.11$). Teachers in the interest exceeds category reported curriculum connectivity as the highest rated element of connectivity ($M = 5.47$, $SD = 0.92$).

Table 4
Curriculum Congruence and Teacher Connectivity

Overall Curriculum Congruence	Community Connectivity		Curriculum Connectivity		School Connectivity		SBAE Teacher Connectivity	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Presence Exceeds	4.98	1.27	5.42	0.78	4.39	1.28	5.05	1.25
Aligned	5.42	1.51	5.58	0.82	4.88	1.07	5.67	1.11
Interest Exceeds	5.18	1.37	5.47	0.92	4.61	0.78	5.12	1.42

Note. Items within the connectivity constructs were measured on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

For research objective three, connectivity was analyzed by teacher career stage (see Table 5). Again, a clear pattern emerged across each of the four elements of connectivity. Specifically, early career teachers reported the lowest level of connectivity followed by mid-career teachers. For each of the connectivity elements, late career teachers reported the highest levels of connectivity. For early career teachers, the strongest connectivity was reported within the curriculum element ($M = 5.24$, $SD = 0.86$). For mid-career teachers, curriculum connectivity was also the highest rated connectivity element ($M = 5.45$, $SD = 0.73$). For late career teachers, community connectivity ($M = 5.75$, $SD = 0.75$) slightly edged out curriculum connectivity ($M = 5.74$, $SD = 0.81$) as their highest rated element of connectivity.

Table 5
Career Stage and Teacher Connectivity

Career Stage	Community Connectivity		Curriculum Connectivity		School Connectivity		SBAE Teacher Connectivity	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Early Career (0-5 Years)	4.52	1.44	5.24	0.86	4.14	1.13	4.79	1.30
Mid-Career (6-19 Years)	5.13	1.24	5.45	0.73	4.61	1.26	5.27	1.26
Late Career (20+ Years)	5.75	0.75	5.74	0.81	4.88	1.06	5.41	0.99

Note. Items within the connectivity constructs were measured on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

In the final research objective, certification type and teacher connectivity were foregrounded (see Table 6). Again, a clear pattern emerged, with traditionally certified teachers outpacing alternatively certified teachers in each of the four elements of connectivity. Among teachers with a traditional certification, the highest connectivity was reported within curriculum connectivity (*M* = 5.46, *SD* = 0.80). For alternatively certified teachers, curriculum connectivity was also identified as the highest rated element of the connectivity (*M* = 5.43, *SD* = 0.86).

Table 6
Certification Type and Teacher Connectivity

Teacher Certification Type	Community Connectivity		Curriculum Connectivity		School Connectivity		SBAE Teacher Connectivity	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Traditional Certification	5.21	1.22	5.46	0.80	4.57	1.11	5.33	1.13
Alternative Certification	4.64	1.46	5.43	0.86	4.38	1.44	4.56	1.42

Note. Items within the connectivity constructs were measured on a seven-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Discussion, Conclusions, & Recommendations

Within any education discipline, research should contribute to higher quality teaching, learning, and disciplinary resilience. As a construct, teacher connectivity addresses both of these aims. Professionals with strong connections do better work and maintain a stronger commitment to their career (Blustein, 2011; Jordan, 2008; Moser & McKim, 2020). Therefore, the current analysis put the spotlight on agriculture teacher connections by evaluating the intersections of connectivity, curriculum congruence, teaching experience, and teacher certification type. Results from this work highlight teacher characteristics yielding higher levels of connections and, conversely, characteristics which may predispose teachers to challenges crafting connections within the discipline.

In research objective one, a new concept (i.e., curriculum congruence) was explored. Curriculum congruence refers to the alignment of personal interests and curriculum taught by agriculture teachers. Results indicate teachers have a balance of interests across the 11 programmatic areas considered. The balanced interest perceived by teachers led to a large proportion of educators falling within the category "interest exceeds" for curriculum congruence, indicating their personal interests are higher than the presence of curriculum within their program. For those areas with a relatively large percentage of teachers in the interest exceeds category (i.e., Natural Resources, Food Products and Processing), there exists an opportunity to increase the presence of these topics to better

align with the interests held by teachers. Encouraging teachers to develop interdisciplinary curriculum which integrates Natural Resources and Food Products and Processing content into well-represented curricular areas (e.g., Animal Science, Leadership) should increase the representation of these subjects without changing course offerings. These actions may bring a larger proportion of teachers into the "aligned" category of curriculum congruence, in which their interests are mirrored by the curriculum represented in the program. If, however, curriculum adaptation is not feasible, our recommendation is for teachers to seek teaching positions in which the existing curriculum and programmatic elements mirror their interests as a method to increase curriculum congruence.

The findings from research objective two provide evidence for the value of having teachers who experience curriculum congruence. Those teachers in the "aligned" category of curriculum congruence reported consistently higher connectivity scores across the four domains of connectivity. This finding supports our conceptual model, which links curriculum congruence, school connectivity, SBAE teacher connectivity, curriculum connectivity, and community connectivity. Additionally, findings from objective two corroborate research linking curricular autonomy and relationships (Pearson & Moomaw, 2005). The apparent importance of curriculum congruence to relationships suggests efforts should be made to bring additional teachers into the "aligned" category of curriculum congruence. Given the absurdity of suggesting teachers become less interested in agricultural subjects, we are left to recommend increasing curriculum representation within programs. Developing interdisciplinary curriculum which brings together multiple agricultural subjects together into one learning experience is our recommendation for crafting curriculum which mirrors the diverse and balanced interests of agricultural educators. An example approach to interdisciplinary curriculum can be found in land-based learning, described by McKim et al. (2019).

Continuing to delve into the concept of connectivity, research objective three included an exploration of career stage and connectivity. Not surprisingly, teachers with more experience reported higher levels of community, curriculum, school, and SBAE teacher connectivity. Building relationships with fellow agriculture teachers, school personnel, curriculum, and community members takes time; thus, teachers early in their career may naturally develop connections as they continue in the profession. Unfortunately, research in teacher retention suggests (a) teachers are most likely to leave the profession early in their career and (b) connectivity is related to teacher retention (Moser & McKim, 2020). Therefore, a passive approach to teacher relationship building may not support efforts to retain teachers relatively new to the profession. As a solution, inclusion of relationship skill building within teacher education programs is recommended, especially experiences focused on building connections with peer teachers and community members.

In the final research objective, certification type and teacher connectivity were analyzed. Results illuminate a challenge for alternatively certified teachers to build relationships within, specifically, their community and with fellow SBAE teachers. Turning to the literature, Blustein (2011) recommends experience and career-specific training are essential to building relationships. Therefore, providing professional development breakout opportunities for alternatively certified teachers exploring the norms of SBAE teachers and strategies for building relationships within their community and the SBAE teaching community is recommended.

This study illuminated a number of important considerations regarding teacher connectivity within SBAE. There are, however, some limitations to the current study. First, the method utilized to measure curriculum congruence could be improved. Comparing curriculum presence and personal interest, both measured on a 100-point scale, could be critiqued. Utilization of a z-score when measuring, and comparing, both curriculum presence and personal interest is recommended in future analyses. Additionally, this study took a potentially myopic viewpoint on teaching experiences (i.e., years of experience and certification type). Increasing the breadth of teacher development experiences

to include, for example, personal backgrounds related to agricultural subjects and prior connections in a community, may help clarify the concept of connectivity within school-based agricultural education.

As the discipline continues to improve, teacher connectivity must become a part of the discourse in school-based agricultural education. Teaching agriculture is a complex task requiring time, talent, and motivation. Teachers who are connected to their curriculum, community, school, and other SBAE teachers have a network to rely on for mentorship, solution identification, and comradery. Therefore, the discipline must be intentional and proactive about empowering teachers, especially those early in their career and alternatively certified, to establish connections and utilize their network of connections to increase the quality of their program.

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