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An Examination of the Curricular Resource Use and Self Efficacy of Utah School-Based Agricultural Education Teachers: An Exploratory Study

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Abstract

There has been a large variety of curricular resources utilized by School Based Agriculture Education Teachers. These resources vary in many ways, including structure, organization, depth of knowledge, and flexibility. The purpose of this study was to explore the Pedagogical Design Capacity of Utah SBAE teachers' through a close examination of the relationship between a teacher's level of self-efficacy and the types of curricular resources they utilized in their classroom. A sample of 114 was drawn from the population of 146 in Utah. Of the 13 curricular resources identified, the curriculum provided by Utah State FFA had the highest frequency of use with 94.1% (f =32.0) of teachers reporting use. It was reported that the mean self-efficacy for Utah SBAE teachers was M = 3.80 (SD = .41). A positive correlation with teacher self-efficacy was reported for five of the resources, seven resources reported a negative correlation, and one resource was found to have a negligible correlation. Each of the resources which produced a positive correlation with self-efficacy were expertly developed curricular resources. Because teachers use several curricular resources, materials should be designed to be used in concert with other sources.

Keywords: self-efficacy; curriculum; curricular use; curricular resource; pedagogical design capacity; pedagogical content knowledge

Introduction

Teachers are constantly faced with complex decisions that require knowledge of their specific content area, in addition to knowing effective teaching methods. In order to properly plan and make good decisions in the face of this daily complexity, teachers must be familiar with their students' levels of development, learning differences, cultural influences, personalities, and interests (Bransford et al., 2005). School-based agriculture education (SBAE) instruction has additional complexities because of the diverse nature of the subject matter across various agriculture, food, and natural resource disciplines as well as SAE and FFA responsibilities (Talbert et al., 2014). In addition to functioning as a professional in a school system and being proficient in the implementation of effective pedagogical practices, SBAE instructors (a) must be knowledgeable in the wide variety of subjects encompassed by the eight agricultural, food and natural resource areas, (b) are responsible for the many aspects of building and supporting an agriculture program that meets community needs, (c) provide hands-on, relevant learning experiences, and (d) coordinate and supervise student work experiences (Talbert et al., 2014). These complexities have resulted in a uniquely talented group of educators and a widely diverse set of programs.

The book *Understanding Agriculture: New Directions for Education* called for a shift for programs to focus on rigorous agriscience instruction to prepare youth to solve complex problems in agriculture (National Research Council (NRC), 1988). When the book was published, many schools were focused on teaching production agriculture in a single teacher program (NRC, 1984). More

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recently AGree, a strategic bipartisan team tasked to drive change in the agricultural system, called for improved instruction in agriculture, specifically in agricultural literacy and STEM concepts (Mercier, 2015). Carnavale et al.(2011), reported a lack of qualified STEM professionals entering the workforce despite the profound need for employees. The demand for STEM professionals has led numerous researchers (Carnavale et al., 2011; DiBenedetto et al., 2015; Swafford, 2018a; Swafford, 2018b) to call for an improvement in STEM instruction.

Curriculum reform efforts have been a major vehicle that has driven change in agricultural education. The word curriculum comes from the Latin word that is literally interpreted as the race or the course (Glatthorn et al., 2012). Dewey (1902) described curriculum as being continuously reconstructed as it moves from the student's prior knowledge and into organized bodies of truth. Bobbit (1918) referred to curriculum as a range of directed and undirected experiences. Tyler (1957) defined curriculum as the planned and directed learning experiences. Curriculum materials are tangible materials that are developed to guide curricular decisions made by the teachers. Curricular materials can range from broadly focused scope and sequence plans provided by a district to a detailed lesson plans with accompanying student support materials (Glatthorn et al., 2012).

The National Council for Agricultural Education established the AFNR standards to provide industry validated standards in the pathways related to agricultural education (Talbert et al., 2014). While some resources have been developed, the development of curricular resources to implement the updated AFNR standards has not come as quickly as the standards update. Thoron and Myers (2010) found that agriculture teachers lacked experience embedding science concepts into agriculture. Myers et al. (2009), called for improving the resources available to teachers to implement STEM instruction. More recently, a myriad free and for-profit curricular resources in agricultural education have been developed (Thoron et al., 2016). The Center for Agricultural and Environmental Research Training (CAERT) curriculum has developed curricular materials in the form of lesson plans and power-point presentations (CAERT, 2019). The iCEV curriculum has been designed as "prebuilt" and "customizable" courses that can be used as stand-alone curricular resources or supplements to existing lessons (iCEV, 2019). The curriculum for agriscience education (CASE) has purported to package a curriculum that embeds inquiry-based science concepts through the use of activity-, project-, and problem-based instructional strategies (CASE, 2012). CASE curriculum was developed to provide lesson plans and instructional materials that guide students through lessons. The National Agriscience Teacher Ambassador Academy has been a professional development opportunity designed to train teachers to embed inquiry-based instruction, then provide an opportunity to share resources and lesson plans that meet their individual goals (NAAE, 2019).

The development of quality curricular materials has shown promise to help teachers implement meaningful instruction in agriculture (Mercier, 2015). According to Lambert et al. (2014), agriculture teachers who attended CASE training enjoyed having the materials available to them. Lambert et al. also noted the teachers who made modifications and tailored the curriculum had the most success in implementation. Ulmer et al., (2013) found an increase in teacher efficacy for teachers who attended a CASE institute.

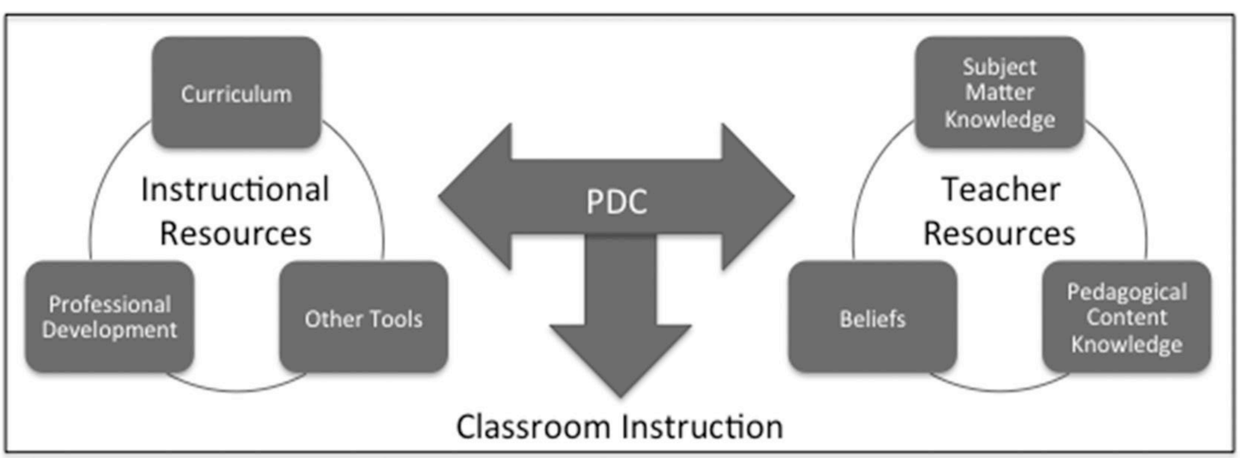
Despite the promise shown by curricular resources, there has been a need to improve how teachers interact with curricular resources. Mercier (2015) called for teacher training on how to assess and evaluate existing curricular resources and adapt them to be used in their instruction. According to Mercier, the problem with curricular resources is not the amount of resources, but rather the consistency of the curriculum. According to Mercier, teachers should be offered training on how to access and evaluate curricular resources. According to Brown (2009), when teachers are mandated to teach a scripted curriculum, they often resist. Brown described healthy curricular interaction as a process where teachers select appropriate materials, interpret the goals of the designers and the merit of the material, reconcile the materials with their goals, make accommodations to fit the needs of their students, and modify the resource appropriately. Comfort (1990) described the process of curriculum modification as adapting curriculum into a learning experience the teacher judges to be reasonable to help meet student learning outcomes. There have been calls for teachers to take a central role in the curricular design process (e. g. Barrick et al., 2018) and calls for improving curricular resources (e. g. Mercier, 2015). Despite these calls, it is not clear how active SBAE teachers should be in the curricular design process. Newcomb et al. (2004), described the teacher as the primary agent responsible for planning instruction. According to Newcomb et al. "This is where each individual's creativity and worth as a teacher is displayed. Once teachers master the ability to plan well, they are free to enjoy teaching" (p. 111). There has been a lack of research on how teachers use resources to help them plan their lessons and teach. This lack of clarity in how teachers use curricular resources has led to variability in the functional design of curricular materials. Understanding what curricular materials teachers use is the first step to designing resources that help teachers plan well so they can become free to enjoy teaching.

Theoretical Framework/Literature Review

This study was theoretically guided by the Pedagogical Design Capacity (PDC) framework adapted from Brown (2009) and Knight-Bardsley and McNeill (2016) (see Figure 1), which examined the relationship between instructional resources, teacher resources, and the resulting classroom instruction. Brown (2009) described teaching as an act of design, where the professionals must find and evaluate resources to design meaningful experiences that help students achieve their goals. According to Brown and Edelson (2003), effective teaching requires teachers to be active in the curriculum selection and design process rather than passively teaching common lessons. This relationship between teachers and resources was examined by Wretch (1991, 1998) who examined the concepts of affordances and constrains. According to Wretch, affordances are the functional properties associated with a particular artifact. Constraints define the boundaries of the use of a particular resource. While constraint typically has a negative connotation, in the terms of curriculum design, constraint can be a good thing, because it provides a detailed plan for instruction in a specific band (Brown, 2009). According to Brown the traditional paradigm in curricular design is to provide constraints for teachers by providing specific lesson plans or set instructional events for teachers to follow.

Figure 1

Framework for Pedagogical Design Capacity (Brown, 2009; Knight-Bardsley & McNewill, 2016)



Brown and Edelson (2003) described three patterns of curriculum use: offloading, adapting, and improvising. Offloading is the use of materials with little to no modification, adapting is contributing one's own design elements to the materials, and improvising is deviation from the lesson plan during class time (Brown & Edelson, 2003). Adaptation refers to how much teachers contribute to the design elements of the curriculum. According to Brown and Edelson, teachers implement curricular adaptations to address student needs, conform to teaching styles, and target learning goals. Most curricular resources lend to a certain degree of adaptation. Brown and Edelson suggested open-ended resources, or resources that can be adapted by the teachers, may be more appropriate for teachers with robust PDC. Offloading refers to the use of a resources with little modification. Teachers who are unfamiliar or uncomfortable with subject-matter in a particular area tend to offload the curricular resource. Resources that lend to offloading should clearly communicate the learning goals and have specific teacher direction. Improvising refers to the ability for teachers to change the course of instruction in action. Teachers comfortable with improvisation will use student questioning or comments to shift the direction of the instruction.

Curriculum designers have faced a distinct challenge when designing curriculum. A need has existed for curricular resources that lend to a high degree of offloading. Beginning teachers, or teachers delivering a lesson in an unfamiliar area, benefit from resources that lend to offloading. Experienced teachers, especially those who have clearly articulated goals for learning, benefit from resources designed to allow for improvisation and adaptation. Curricular resources designed to be for every teacher and to be followed in a specific order belies the ability of teachers to build PDC and use resources to meet specific curricular goals (Brown & Edelson, 2003).

The framework of PDC described the interaction between instructional resources and curricular resources (Brown, 2009; Knight-Bardsley & McNewill, 2016). The overall quality of curricular resources varies. In math education, Remillard et al., (2018) found a lack of explicit attention to overall instructional goals in several widely used comprehensive curricular resources. According to Thornton (2005) curriculum designers who intend to design 'teacher-proof' curriculum that is too structured will have poor implementation. In agricultural education, Lambert et al. (2014) noted some teachers found the CASE training difficult to implement, especially when shifting from teacher-centered approaches to learner-centered approaches. Lambert et al. also noted none of the teachers in their qualitative study were able to teach the entire curriculum to their students as it was designed.

Despite the issues identified in existing curricular materials, there has been some promise in the curriculum design literature. In a seminal work on curricular design reform, Ball and Cohen (1996) called for educative curriculum, or curriculum that promotes teacher learning and creates autonomy in design. Educative curriculum materials allow for teacher adaptation, provide helpful materials like rubrics, example student work, and narratives that describe how teachers enact lessons (Davis et al., 2017). Davis et al. found educative curriculum to significantly improve teacher content knowledge and can lead to improved student learning. Krajcik and Delen (2017) purported educative curriculum to be an effective way to help teachers develop new teaching strategies, adding new tools in their toolbox.

The framework of PDC also explores the impact of teacher resources, or the impact the abilities teachers have on PDC (Brown, 2009; Knight-Bardsley & McNewill, 2016). Teacher resources were described as an interaction of pedagogical content knowledge, subject matter knowledge, and teacher beliefs. Pedagogical content knowledge is a blend of knowledge of students, instruction, curriculum, assessment, and orientation (Kind, 2009). Rice and Kitchel (2017a) found that agriculture teachers' pedagogical content knowledge was shaped by their previous interactions with agricultural education as a student or work in production agriculture. Rice and Kitchel (2018) noted that plant science teachers combined their overarching beliefs about the purpose of agricultural education with their beliefs about teaching and learning when developing their pedagogical content knowledge. These beliefs were formative when agriculture teachers seek new instructional resources to improve their teaching (Rice & Kitchel 2017b).

Teacher self-efficacy is a teacher's judgement of their ability to bring about a desired outcome in student engagement and learning (Armor et al., 1976; Bandura, 1977). Teacher efficacy has been shown to powerfully impact many meaningful outcomes in the classroom (Tschannen-Moran &

Woolfolk Hoy, 2001). These outcomes include teacher persistence, enthusiasm, commitment, and instructional behavior, in addition to student outcomes such as achievement, motivation and self-efficacy beliefs, according to Tschannen-Moran and Woolfolk Hoy. Low self-efficacy has been linked to agriculture teachers deciding to leave the classroom (Knobloch & Whittington, 2002; McKim & Velez, 2015). According to Guskey (1988), teachers with high self-efficacy are more likely to implement new strategies or approaches. McKim, Velez, and Clement (2017) found CASE certification to be a significant predictor for self-efficacy. Ulmer et al. (2013) reported an increase in science teaching self-efficacy when teachers participated in a CASE institute. These findings indicate a connection between curricular use and self-efficacy.

PDC is employed when teachers design classroom instruction by blending their knowledge and background with the curricular resources they call on to shape instruction. The literature on curriculum design, in particular teacher interaction with curricular design, ranges from providing curriculum for teachers to use intact, or with high levels of offloading, to enact educational reform (e. g. Wilcox et al., 2014) to promoting autonomy by engaging teachers as the curricular designers (e. g. Ellingson, 2018). The balance between these polar extremes examines how teachers interact with resources in a more natural way. Dietiker et al. (2018), described curricular noticing, or exploring how teachers examine, interpret, and enact various curricular resources. According to Dietiker et al., curricular practice should move toward empowering teachers to make informed decisions about curricular use and implementation rather than designing resources to be taught with high levels of offloading. Amador (2016) found elementary math teachers interact with curricular resources in different ways and shift between offloading, adapting, and improvising. According to Amador, these shifts were based on what they perceived to be important for summative assessments. Wilcox et al. (2014), found that teachers were more likely to implement a new curriculum into their instruction if they adapted it to fit their needs. Polly (2017) found that elementary math teachers use supplemental materials to a high degree including internet resources such as Teachers Pay Teachers. Further, Polly found that teachers used mathematics resources as supplemental resources even when they were designed to be the primary curriculum.

Previous studies have explored the curricular interaction of science teachers (e. g. Arias, et al., 2016; Parke & Coble, 1997), history teachers (e. g. Reisman & Fogo, 2016) and math teachers (e. g. Remillard, 2005). Despite the American Association of Agricultural Education's National Research Agenda (Thoron et al., 2016) and research related to methods, models, and practices that are effective in leading change (Lindner et al., 2016), little research has been done to investigate the curricular interaction that takes place in SBAE and how various resources lead to efficacious behavior (Bandura, 1977; Tschannen-Moran, & Woolfolk Hoy, 2001).

Purpose and Objectives

The purpose of this study was to explore PDC of Utah SBAE teachers' through a close examination of the relationship between a teacher's level of self-efficacy, and the types of curricular resources they utilized in their classroom. The study exams the National American Association of Agricultural Education Research Priority Area 5: Efficient and Effective Agricultural Education Program (Thoron et al., 2016). The study was guided by these objectives:

1. Describe the self-efficacy of SBAE teachers.
2. Describe the curricular resources being utilized by Utah SBAE teachers, and how they interact with each resource.
3. Describe the PDC pattern of teachers.
4. Examine the relationship between a teacher's self-efficacy and the curricular resources they utilize.

Methods

This study used a descriptive correlational design to determine the curricular use of Utah SBAE teachers and to examine the relationship between self-efficacy and curricular resource use. The target population for this study was SBAE teachers in Utah during the 2017-2018 school year. The population frame was established using the secondary agriculture teacher directory, provided by the state agriculture education office. The population consisted 146 teachers. A non-random sample of 114 teachers was taken. A census was not used because 32 randomly selected teachers were participating in a different study and we were asked to not include them in the data collection. The instrument was administered online utilizing Qualtrics as an online delivery tool following the tailored design method (Dillman et al., 2014). Each teacher from the provided list was emailed a personal link and asked for their participation. An initial contact email was sent requesting participation. Three follow-up emails were sent in the subsequent weeks.

An instrument was developed to identify how teachers interact with curricular resources. In order to describe the self-efficacy of SBAE teachers, the 12-item short form of the Teacher Sense of Efficacy Scale (TSES) was used (Tschannen-Moran, & Woolfolk Hoy, 2001). The Cronbach's of the pre-existing scale was $\alpha = .80$. The post hoc reliability was $\alpha = .83$. To identify which curricular resources are currently being utilized by SBAE teachers, and how they interact with each resource, a list of 13 curricular resources was created. The list included Curriculum provided by Utah FFA, NAAE Communities of Practice, the Agriculture Experience Tracker (AET), Agriculture in the Classroom, Textbook(s), Pintrest, Teachers pay Teachers, iCEV, Cooperative Extension Service resources, USDA Resources, My Journey (National FFA), curriculum provided by the local school district, and Curriculum for Agriscience Education (CASE). The list was prepared by the researchers. Prior to the instrument being sent, the list was reviewed by a teacher educator and a state supervisor of agricultural education in the state. Items were added to the list based on their recommendations. Participants were also provided the opportunity to identify other curricular resources.

On the instrument, participants were first asked to select the resources which they currently utilize and specify information on textbooks and school provided curriculum. Skip logic was utilized to ask follow-up questions for the resources utilized by the participants. For each resource that was identified, participants were asked how often they use the resource using a slider scale with hidden numerical responses ranging from 0-100 with 0 indicating never, 25 indicating once per semester, 50 indicating twice per semester, 75 indicating monthly usage, and 100 indicating daily usage. According to Roster et al. (2015), slider scales produce comparable, or superior, data to radio-button scales and are more engaging for participants. Participants were asked to rate the structure and organization of the resource on a semantic differential sliding scale from 0-100 with anchor points of "very poor" and "very good." Additionally, participants responded to three items based on PDC patterns of curriculum interaction: offloading, adapting and improvising (Brown & Edelson, 2003). The offloading scale asked participants to rate their familiarity with the resource using a 0-100 scale with "not familiar" and "very familiar" as the anchor points. The adaptation scale used a 0-100 sliding scale with anchor points of "no modification" and "a lot of modification." The improvising scale asked participants how much they allow their plans to change during class time when using the resource using a 0-100 scale with "no improvisation" and "a lot of improvisation" as the anchor points.

The instruments were reviewed by a panel of experts consisting of an assistant professor in agricultural education, a full professor in agricultural education, a full professor in agricultural economics, and a mater's student in agricultural education. These data were collected as a pilot study for a larger study. Early and late respondents were compared to test for non-response error, as suggested by Lindner et al. (2001). The early respondents were those who completed the instrument after the first two contacts. A chi-square test of independence was performed to examine the relationship between the variable of teacher self-efficacy, frequency of use for Utah curriculum, and structure of Utah curriculum. Frequency of use and structure of Utah curriculum were used because it had the highest level of use from the respondents. The relationship between early and late respondents teacher self-efficacy was X^2 (1, 14) = 13.04, *p* = .52, the relationship between early and late respondents and frequency of use for Utah curriculum was X^2 (1, 16) = 14.93, *p* = .53 and the relationship between early and late respondents and structure of Utah curriculum was X^2 (1, 24) = 23.87, *p* = .47. No difference was determined for these variables between early and late respondents. Caution should be made when interpreting these results because of the non-random sample method employed. Because of the sample method used, should not be inferred to the larger population. A total of 34 Utah agriculture educators responded to the instrument yielding a response rate of 31.5%, 66.7% male (*n* = 24), 27.8% female (*n* = 10), ranging from 23-60 years of age and 1-34 years of teaching experience. Of the respondents, 64.7% (*n* = 22) completed an agriculture preservice teaching program, 12% (*n* = 4) completed a non-agricultural preservice teaching program, and 26% (*n* = 9) received an alternate route licensure; 58% (*n* = 20) of respondents held Master's degrees. Data were analyzed using SPSS version 23. Means and standard deviations were used for objectives one and two. For objective three, point-biserial (r_{pb}) correlations were used. The correlations were reported using orders of magnitude described by Davis (1971) and Miller (1998).

Findings

Objective 1: Describe the self-efficacy of SBAE teachers.

The self-efficacy of Utah SBAE teachers was reported using the TSES scale. Each item that made up the scale asked teachers how much they believed they had an influence on an aspect of their teaching. The scale used five Likert-type responses: nothing, very little, some influence, quite a bit, a great deal. The summated scale provides a measure of overall self-efficacy where higher numbers represent highly efficacious behaviors. The questions regarded how much impact the teacher believed he/she could have. The mean self-efficacy for Utah SBAE teachers was *M* = 3.80 (*SD* = 0.41) which most closely aligns with the anchor, quite a bit of influence.

Objective 2: Describe the curricular resources being utilized by Utah SBAE teachers, and how they interact with each resource.

Respondents were asked to select the curricular resources they utilize from a list provided. The respondents used an average of 4.9 (*SD* = 1.8) resources. The number of resources used was normally distributed. The number of curricular resources used is displayed on Table 1.

Table 1

Distribution of the Number of Curricular Resources Utilized by Utah SBAE Teachers

Distribution of the Number of Curricular Resources Utilized by Utah SBAE Teachers Number of Resources	*f*	%
1	1	2.9
2	2	5.9
3	4	11.8
4	9	26.5
5	5	14.7
6	6	17.6
7	4	11.8
8	3	8.8

The Utah FFA curriculum was the most used resource by teachers with 91.4% (*n* = 32) of the teachers utilizing the resource. Other resources utilized by at least half of the respondents included NAAE Communities of Practice (76.5%; *n* = 26), Agriculture Experience Tracker (AET) (73.5%; *n* =

25), and Agriculture in the Classroom (50%; n = 17). Participants were asked to identify how often they used each resource by using a 100 point sliding scale with five anchors: never (0), once per semester (25), twice per semester (50), monthly (75), and daily (100). Each selected resource was also rated according to its structure and organization, using a 100-point semantic differential scale with two anchor points: very poor (0) and very good (100). The mean and standard deviation for each item was reported (see Table 2).

Table 2

Frequency of Curricular Resources Utilized

	Teachers Using Resource		Frequency of Use*		Rate of Structure and Organization*	
Curricular Resource	*f*	%	*M*	*SD*	*M*	*SD*
Curriculum provided by Utah FFA	32	94.1	85.1	16.5	65.1	23.1
NAAE Communities of Practice	26	76.5	53.2	25.5	65.5	22.2
Agriculture Experience Tracker (AET)	25	73.5	62.9	21.4	56.3	24.6
Agriculture in the Classroom	17	50.0	39.8	23.1	75.3	16.7
One or more Textbook	16	47.1	71.6	18.9	62.3	22.5
Pinterest	12	35.3	55.5	26.2	40.1	20.1
Teachers Pay Teachers	10	29.4	39.9	29.9	69.0	22.4
iCEV	7	20.6	74.1	19.7	48.3	28.3
Cooperative Extension Services resources	6	17.6	54.7	26.6	60.3	8.5
United States Department of Agriculture (USDA)	5	14.7	50.6	17.4	60.2	22.3
National FFA My Journey	4	11.8	23.0	5.5	60.8	26.2
School/District Provided Curriculum	3	8.8	90.0	12.5	86.0	1.0
Curriculum for Agriculture Science Education (CASE)	3	8.8	35.5	17.7	47.0	43.9

*Responses were reported on a scale from 0-100 and were only measured by the teachers who utilized the resource.

Objective 3: Describe the PDC pattern of teachers.

The PDC patterns of curriculum interaction, identified by Brown and Edelson (2003), were described using three separate items, each with a 100-point semantic differential sliding scale, for each curricular resource selected. Offloading behaviors refer to the amount teachers use the resource without modification. To determine offloading levels, participants were asked to identify how often they modified the resource before using lessons in the classroom, with anchor points no modification and a lot of modification. The resource that was most commonly offloaded was AET (M = 23.1; SD = 19.5), and Pinterest was identified as being least offloaded (M = 80.6; SD = 13.2). To explore adaptation levels, participants were asked how familiar they are with the technical agriculture content that is being covered by the resource, with anchor points not familiar and very familiar. Teachers were most familiar with the technical agriculture content covered by the school/district provided curriculum (M = 96.0; SD = 6.9), and least familiar with the content covered by AET (M = 42.1; SD = 31.9). Improvisation levels were determined by asking respondents how much they improvise and change lesson plans during class time, based on student questions and interest, with anchor points no improvisation and a lot of improvisation. Pinterest was reported to most lend itself to improvisation in the classroom (M = 79.1; SD = 9.5). Resources received from the County Extension Service were reported to have the lowest level of improvisation (M = 39.6; SD = 41.3) (see Table 3).

Table 3

Pedagogical Design Capacity Patterns of Utilized Curricular Resources

		Level of Lesson Modification		Familiarity with Content		Level of Improvisation	
Curricular Resource	*n*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Curriculum provided by Utah FFA	32	52.4	20.6	79.9	17.4	69.2	18.0
NAAE Communities of Practice	26	47.3	27.1	55.4	30.2	58.8	24.9
Agriculture Experience Tracker (AET)	25	23.1	19.5	42.1	31.9	46.9	25.1
Agriculture in the Classroom	17	37.0	27.4	63.1	24.0	49.4	23.4
One or more Textbook	16	41.2	26.5	71.3	19.4	54.8	23.2
Pinterest	12	80.6	13.2	71.1	20.1	79.1	9.5
Teachers Pay Teachers	10	30.9	25.9	68.6	25.8	53.5	24.5
iCEV	7	27.1	33.5	74.0	35.9	56.8	24.8
County Extension Services resources	6	41.3	30.6	62.0	29.1	39.6	41.3
United States Department of Agriculture (USDA)	5	43.0	15.9	58.8	30.2	56.0	23.3
National FFA My Journey	4	28.5	13.8	58.3	33.8	28.8	19.6
School/District Provided Curriculum	3	46.7	30.1	96.0	6.9	42.3	44.4
Curriculum for Agriculture Science Education (CASE)	3	49.0	0.0	59.0	25.5	50.0	1.4

Note. Responses were reported on a scale from 0-100 and were only measured by the teachers who utilized the resource.

Objective 4: Examine the relationship between a teacher's self-efficacy and the curricular resources they utilize.

A comparison between teacher self-efficacy and the curricular resources was determined by point-biserial (r_{pb}) correlations reporting using Davis's (1971) descriptive magnitudes and were displayed on table 4. Significance was not reported because of the exploratory nature of the study. The use of CASE showed a substantial positive correlation ($r = .54$) with teacher self-efficacy. Agriculture in the Classroom ($r = .30$), AET ($r = .30$) and USDA ($r = .31$) all showed a moderate positive correlation. County Extension Service resources showed a low positive correlation ($r = .12$). NAAE Communities of Practice ($r = -.13$), curriculum provided by Utah FFA ($r = -.10$), using one textbook or more ($r = -.13$), the National FFA My Journey ($r = -.18$), and school/district provided curriculum ($r = -.10$) all showed a low negative correlation. Pinterest ($r = -.39$) and Teachers Pay Teachers ($r = -.46$) both reported a moderate negative correlation with teacher self-efficacy. There was a negligible correlation reported for iCEV ($r = -.09$). Phi coefficients were used to examine the relationship between the use of curricular resources. There was a substantial positive relationship between the use of pintrest and teachers pay teachers ($\phi = .47$) and NAAE Communities of Practice and Using at least one textbook ($\phi = .47$). There was a moderate positive relationship between the use of agriculture in the classroom and FFA my Journey ($\phi = .37$) as well as using at least one textbook and Cooperative Extension Service ($\phi = .34$)

Table 4

Point-Biserial Correlations (r_{pb}) and phi (ϕ) Coefficients Between the Teacher Self-Efficacy and Curricular Resources

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. TSE	--	-.10	-.13	.30	-.01	-.13	-.39	-.46	-.09	.12	.31	-.18	-.17	.54
2. UtahFFA		--	.16	-.15	.00	-.27	.19	.16	.13	-.21	.10	.09	.08	.08
3. NAAE			--	.14	.14	.44	.27	.21	-.06	-.11	-.16	.20	-.07	-.07
4. AET				--	.20	.17	.03	-.05	.14	.28	.06	.22	-.05	.19
5. AITC					--	.12	-.25	.00	.07	.00	-.08	.37	-.10	.10
6. Textbook						--	-.08	-.09	.10	.34	.27	.02	.12	-.09
7. Pinterest							--	.47	-.07	-.18	.04	-.08	.20	-.23
8. TPT								--	.15	.04	-.27	.17	.25	-.20
9. iCEV									--	.34	-.01	.04	-.16	.10
10. CES										--	.24	-.17	-.14	-.14
11. USDA											--	-.15	-.13	.16
12. FFA												--	-.11	-.11
13.School													--	-.10
14. CASE														--

Note. Significant correlations were not flagged following Davis's (1971) recommendation to express orders of magnitude.

Conclusions and Recommendations

This study sought to examine the curricular resources utilized by Utah SBAE teachers as well as the relationship between PDC and self-efficacy. The findings indicated teachers use a variety of resources rather than relying on one resource as the primary curriculum. There was a large variation in the frequency of teachers using various curricular resources. Similarly, the frequency of use varied from relatively infrequent use to daily use. This variation in resource and frequency indicated that teachers draw from a wide range of curricular resources and implement the resources differently. We also found a fluctuation in the levels of offloading, content familiarity, and level of improvisation. While Brown and Edelson (2003) explained the variation in these variables among resources should exist, it is interesting to note the levels of offloading for various resources. While the Utah FFA curriculum lends itself to low levels of offloading, resources such as AET, Agriculture in the Classroom, and iCEV lead to offloading behaviors. Expert developed resources had the highest correlations with self-efficacy.

The Utah FFA curriculum indicated moderate levels of adapting practices. Further, the participants rated the design of the curriculum positively. These findings indicate the Utah FFA curriculum receives a moderate level of adoption from the teachers. Further, the teachers who used the curricular resource were familiar with the content and are able to adapt the materials and improvise during their instruction. This resource might provide a starting point for other states considering developing a statewide curriculum resource for teachers. These materials were designed by groups of expert teachers in the state with coordinated efforts from business and industry (W. Diemler, personal communication, December 12, 2018). Future investigations should examine how teachers utilize other resources in concert with the resources provided by the state.

Resources that have been developed by experts including CASE, AET, USDA, and Ag. in the Classroom showed a positive relationship with teacher self-efficacy, while peer shared resources including pintrest and teachers pay teachers showed negative correlations with teacher self-efficacy. These initial findings show a relationship between efficacious behavior and seeking expertly developed resources. The characteristics of these curricular resources should be examined in further research. As correlations do not establish a cause-effect relationship, future studies should examine if more efficacious teachers sought these curricular resources or if the use of these resources leads to efficacious behaviors. The relationship between teacher self-efficacy and the use of CASE curriculum was the highest. Caution should be made when examining these results because of the low number of teachers using CASE curriculum in this sample. Studies in states where the use of CASE curriculum is more prevalent would illuminate if CASE is tied to teacher self-efficacy.

The AET resources showed high levels of offloading by teachers despite not being designed as an inclusive lesson-plan/curriculum package. The curriculum provided the Utah FFA showed higher levels of adapting and improvising. Future research should explore if the layout of these resources leads to adapting or offloading behaviors or if content familiarity predicts offloading/adapting behaviors. Further research should also be conducted to examine the relationship of PDC variables to the design of the resource to determine the best practices in curriculum design.

We found that 41.2% (n = 16) use at least one textbook. We also found the mean usage for textbook users was monthly and fell only behind Utah FFA curriculum, school and district curriculum, and iCEV in frequency of use. Further investigations should examine why textbooks are not more widely used if those who do use them, are using them with such frequency. Can the textbook guide dynamic instruction or is it used as a reference? Those findings could hold implications for textbook designers.

This study holds several recommendations for state agricultural education leaders. The curriculum provided by the state agricultural education governing body had a high rate of adoption. Since it is widely used, careful consideration should be made about the content and design of this curriculum. These findings demonstrated that teachers do not rely on a single source. Therefore, curriculum designers should not design resources with the intent of being the only resource utilized. State adopted curricular resources, in particular, should be designed in a way that provides a baseline for teachers that allows them to add other curricular resources to enhance their teaching. Lambert et al. (2014) found that teachers who implemented CASE were not able to teach the entire curriculum in a school year. Since professionals do not use single curricular resources, designers should consider omitting finite dates and allow teachers to organize material from resources to meet their overall goals. These findings showed Utah to have a low implementation of CASE. Future research should examine how CASE certified teachers use other resources to deliver instruction. Further investigations should examine how teachers draw from multiple curricular resources within a lesson, unit, or throughout an entire course.

Because of the diversity of community needs, agricultural production, and teacher knowledge, agricultural education programs should be variable (Talbert et al., 2014). Teachers are also professionals tasked with making complex curricular choices for their students (Bransford et al., 2005). Teachers should be empowered to choose curricular resources that promote student learning towards their programmatic goals. Teachers should not be expected to be curricular designers and create every lesson and accompanying material from scratch. Conversely, teachers should not be expected to be an easel for pre-packaged curriculum, expected to present a pre-designed course with no agency. Curriculum designers should be cognizant of how the end user will interact with the resources and design them accordingly. Similarly, teachers should play an active role in selecting and modifying resources to fit their goals and the needs of their students (Brown & Edelson, 2003).

Caution should be made when examining these results. While non-response bias was controlled, the limited response rate and non-random sampling procedures limit the generalizability to the larger population. Additionally, these findings are limited to respondents who participated in this study and will vary in other states. Curricular practices of teachers in other states should be the subject of further inquiry. This study provides an exploratory view for how teachers in Utah interact with curricular resources. This study should be replicated with more robust sampling techniques to provide a clear picture of how teachers use curricular resources. We recommend qualitative studies to investigate how teachers select, modify, and use curricular resources. The descriptive nature of this study lacks the richness of detail that could be afforded by in-depth case studies of curricular interaction. Conversely, quasi-experimental designs should be implemented to examine the educative features of curricular resources used in agricultural education.

Newcomb et al. (2004) purported that the worth of a teacher is demonstrated in a teacher's ability to plan, and that once they learn to plan well, they are free to enjoy teaching. Based on the findings of this study, we would agree that the worth of a teacher is measured by the ability to plan and deliver effective instruction. However, teachers should not be expected to dream up creative lessons from scratch for every moment of instruction but should rely on a wide array of resources that help them meet the goals they have established for their students.

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