

The Validation of Preservice School-Based Agricultural Education Teacher Dispositions

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Abstract

Effective teaching encapsulates professional, interpersonal, and intrapersonal knowledge. Likewise, dispositions influence educators' understanding of when and how to utilize knowledge and skills, especially in the context of their particular classrooms. While dispositions are a crucial piece of educator preparation program accreditation, neither InTASC nor CAEP provides a guide on which dispositions should be assessed. Without a valid and reliable instrument for SBAE educator preparation programs and limited research, further investigation is needed to provide teacher educators with tools to measure and implement dispositions to increase the growth of preservice agriculture teachers. This study was informed by the human capital theory, allowing the researchers to validate a list of preservice SBAE teacher dispositions through a principal component analysis (PCA). The PCA fit to five components which resulted in 18 of the 28 items loading above a 0.6, accounting for 59.6% of the explained variance and resulted in an overall Cronbach's alpha of 0.98. The resulting components included Empathetic and Considerate, Directed, Engaged and Attentive, Personal Integrity, and Emotional Maturity. To accomplish the essential human capital growth during the teacher preparation program and clinical teaching experience, modeling the components is pivotal in furthering the professional dispositions of SBAE teacher aspirants.

Introduction and Literature Review

Effective teaching is complex as it encapsulates professional, interpersonal, and intrapersonal knowledge (Schulte et al., 2005). Teacher effectiveness involves more than expertise; it also incorporates contextual dispositions such as enthusiasm, reflective practice, and positive relationships with students (Edwards & Edick, 2006). Likewise, dispositions influence educators' understanding of when and how to utilize knowledge and skills, especially in the context of their particular classrooms (Saltis et al., 2020). Moreover, teacher dispositions relate to teacher effectiveness, quality, and student achievement (Edwards & Edick, 2006; Flowers, 2006; Schulte et al., 2005).

The Interstate New Teacher Assessment and Support Consortium (InTASC) introduced teacher dispositions in the 1990s to evaluate how new teachers use knowledge and skills (Schussler et al., 2010). Dispositions evaluations are currently used as a requirement of accreditation for educator preparation programs by The Council for the Accreditation of Educator Preparation (CAEP, 2022). According to CAEP and InTASC, dispositions are “the habits of professional action and moral commitments that underlie an

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educator's performance," (Council of Chief State School Officers, 2013, p. 6; *Glossary – Council for the Accreditation of Educator Preparation*, n.d.).

While dispositions are a crucial piece of educator preparation program accreditation, neither InTASC nor CAEP provides a guide on which dispositions should be assessed. Educator preparation programs must identify and create measurements individually (Flowers, 2006; Saltis et al., 2020). According to CAEP, the lack of explicit dispositions allows programs to identify dispositions that align with their programs (Saltis et al., 2020). However, it is challenging to create valid and reliable measurements for dispositions because of the difficulty in measuring internal beliefs and human behavior (Flowers, 2006; Schulte et al., 2005), lack of clear definitions (Borko et al., 2007), and because programs are often recreating the wheel (Saltis et al., 2020). Additionally, Diez (2006) notes that disposition measurements are often disconnected from knowledge and performance, often focusing on what is easy to measure and enforcing a culture of compliance by screening teacher candidates instead of providing feedback for growth.

Preservice teachers enter education preparation programs with different backgrounds and do not begin with all the skills, knowledge, and dispositions needed to be effective educators. It is assumed they have different trajectories based on the social context and their individual experiences (Vagi et al., 2019). Dispositions are critical in educator preparation programs because it is not enough for teachers to have content and pedagogical knowledge — teachers need to know when to apply knowledge and skills in the classroom (Saltis et al., 2020; Schussler et al., 2010). Teachers must be self-aware of their attitudes and perceptions to enact the knowledge and skills needed as an educator. It is imperative that educator preparation programs assist teacher candidates in cultivating dispositions and self-awareness (Schussler et al., 2010).

Within school-based agricultural education (SBAE), the importance of dispositions is highlighted in a model for teacher preparation in agricultural education and the standards for SBAE teacher preparation programs (*Standards for School-Based Agricultural Education*, 2017; Whittington, 2005). Effective agriculture teachers are expected to teach, supervise work-based learning, advise student organizations (Talbert, 2014), and demonstrate personal dispositions such as being trustworthy, respectful, and empathetic (Eck et al., 2019). However, there is limited research on dispositions within SBAE. Cooperating and preservice mentor teachers differ on their opinion of the essential dispositions for preservice agriculture teachers (Bachman & Thiel, 2021) and SBAE teacher preparation programs in agricultural education in the North Central region of the American Association of Agricultural Educators (AAAE) measured different dispositions and varied in evaluation practices (Claflin et al., 2024).

Research highlights the importance of dispositions in teacher effectiveness and quality (Edwards & Edick, 2006; Flowers, 2006; Schulte et al., 2005) and recognizes the distinct role of agriculture teachers (Eck et al., 2019; Talbert, 2014). However, agricultural education educator preparation programs often utilize university-wide dispositions due to accreditation requirements (Claflin et al., 2024). However, educator preparation programs are recommended to foster the development of preservice teacher dispositions (Schussler et al., 2010). Without a valid and reliable dispositions list for SBAE educator preparation programs and limited research, further investigation is needed to provide teacher educators in SBAE with tools to measure better and implement dispositions to increase the growth of preservice agriculture teachers.

Theoretical Framework

This study was informed by human capital theory (Becker, 1964). Introduced by economists, human capital theory posits that as people invest in themselves through education and training, their productivity also increases (Goldin, 2016). Furthermore, researchers utilizing human capital theory also

seek to examine the effect of the investment in education and training on individuals (Nafukho et al., 2004; van Loo & Rocco, 2004). Situating human capital theory within agriculture teacher preparation, there are connections to both the development of knowledge and skills of the future educators (Eck et al., 2021), while also recognizing the traits that are needed to be employable (Knight & Yorke, 2003; Robinson & Baker, 2013). The human capital of agriculture teachers is partly developed within educator preparation programs (Eck et al., 2020) and undergirded by the given standards from InTASC and CAEP (Council for the Accreditation of Educator Preparation, 2022; Council of Chief State School Officers, 2013). It is crucial to focus on the context of SBAE teacher preparation because human capital is directly related to a profession (Lepak & Snell, 2002; Smith, 2010). Specifically, dispositions are a form of human capital necessary for agriculture teachers to be successful, therefore we sought to clarify which are essential dispositions for SBAE teachers.

Purpose of the Study

The purpose of this study was to validate a list of preservice SBAE teacher dispositions, as identified by Claflin et al. (2024). Three research objectives guided this study:

1. Identify the importance of SBAE teacher disposition components,
2. Determine the essential components related to SBAE teacher dispositions, and
3. Establish the reliability of the specific components within the preservice SBAE teacher dispositions list.

Methods and Procedures

This study employed a non-experimental survey research design (Gay et al., 2012). The population of interest was current in-service SBAE teachers across the United States ($N = 13,349$; Foster et al., 2022). To reach this population of interest, two contact methods were implemented. The first method utilized a randomized sample of 750 SBAE teachers' email addresses provided by the National FFA organization in the Fall of 2022. Seven hundred and fifty email addresses were the maximum request allowed by National FFA, therefore the research team chose to request 750 randomized email addresses to develop a nationwide sample. Considering the limited reach of 750 SBAE teacher email addresses, the research team identified social media as an additional outlet to further expand upon the sample frame a-priori. The social media frame included four posts on the *Ag Education Discussion Lab* on Facebook. The *Ag Education Discussion Lab* is a private group on Facebook designed for SBAE teachers to discuss pertinent issues across a complete SBAE program. This additional instrument distribution was posted on the same day as the initial email was sent to further expand the potential nationwide sample to validate the dispositions list. The preservice SBAE teacher dispositions instrument was distributed via email and Facebook post. The email and post both provided access to a Qualtrics survey link, which included the 84-item instrument. Email instrument distribution followed the recommendations of Dillman et al. (2014) and included an initial recruitment email followed by three reminder emails.

The preservice SBAE teacher dispositions instrument was developed based on the findings of a regional content analysis (Claflin et al., 2024), which aimed to identify the necessary dispositions in universities' preservice preparation programs. This list of dispositions was comprehensive based on the current disposition measures being used in SBAE teacher preparation programs (Claflin et al., 2024). The tailored design method was employed (Dillman et al., 2014) to help the research team overcome common threats to validity and reliability of survey research. This included optimizing the Qualtrics instrument for web and mobile device compatibility, using consistent layouts and verbiage, and allowing participants to move between pages or pause their response.

In addition to the 84-item preservice SBAE teacher dispositions instrument, personal and professional characteristics (e.g., gender, age, certification pathway, highest degree earned, years of

experience, program size, and state) of the participants were collected. The study resulted in responses from 272 SBAE teachers nationwide. Of those responses, 160 were complete responses used for data analysis. Unfortunately, due to the nature of data collection (i.e., the combination of email addresses and Facebook posts), the determination of an overall response rate was not possible. For the 750 random email addresses, 47 were returned undeliverable, and 116 were returned complete, resulting in a usable response rate of 16.5% for the email contacts. Forty-four complete responses were received via the social media posts on Facebook. The *Ag Education Discussion Lab*, where it was initially posted, had 13,800 members, but how many of those are currently SBAE teachers and are active on Facebook is unknown. The Facebook post was reposted three times following the initial posting. The four posts combined resulted in 36 likes and 27 comments. The 160 participants spanned 40 states and one territory. Table 1 provides an overview of their personal and professional characteristics. The data was compared between the two respondent groups (i.e., email recruitment and Facebook post) to determine if differences existed (Miller & Smith, 1983). Based on the personal and professional characteristics of the SBAE teacher participants (see Table 1) no statistically significant differences existed.

Table 1*Personal and Professional Characteristics of SBAE Teacher Participants (n = 160)*

Characteristic		<i>F</i>	%
Gender	Male	61	38.2
	Female	96	60.0
	Prefer to not respond	3	1.8
Age	21 to 25	24	15.0
	26 to 30	44	27.5
	31 to 35	7	4.4
	36 to 40	14	8.7
	41 to 45	18	11.3
	46 to 50	24	15.0
	51 to 55	10	6.3
	56 to 60	6	3.7
	61 or older	10	6.3
	Prefer to not respond	3	1.8
Certification Pathway	Traditionally Certified – Bachelor’s Degree	116	72.5
	Traditionally Certified – Master’ Degree	15	9.4
	Alternatively Certified	23	14.4
	Emergency Certified	2	1.3
	Not Certified	3	1.8
	Prefer to not respond	1	0.6
Highest Degree Earned	Bachelor’s	76	47.5
	Master’s	76	47.5
	Terminal Degree	6	3.8
	Prefer to not respond	2	1.2
Years of Experience	First Year	16	10.0
	2 to 5	40	25.0
	6 to 10	26	16.3
	11 to 15	18	11.2
	16 to 20	22	13.8
	21 to 25	17	10.6
	26 to 30	9	5.6
	31 or more	12	7.5
Program Size (Teachers)	1	73	45.6
	2	52	32.5
	3	8	5.0
	4	11	6.9
	5	8	5.0
	6 or more	8	5.0

State			
Alabama	2	1.2	
Alaska	0	0.0	
Arizona	1	0.6	
Arkansas	1	0.6	
California	8	5.0	
Colorado	1	0.6	
Connecticut	0	0.0	
Delaware	0	0.0	
Florida	4	2.5	
Georgia	3	1.8	
Hawaii	0	0.0	
Idaho	1	0.6	
Illinois	8	5.0	
Indiana	3	1.8	
Iowa	6	3.7	
Kansas	3	1.8	
Kentucky	2	1.2	
Louisiana	1	0.6	
Maine	0	0.0	
Maryland	1	0.6	
Massachusetts	0	0.0	
Michigan	2	1.2	
Minnesota	5	3.1	
Mississippi	0	0.0	
Missouri	11	6.9	
Montana	4	2.5	
Nebraska	2	1.2	
Nevada	1	0.6	
New Hampshire	0	0.0	
New Jersey	2	1.2	
New Mexico	2	1.2	
New York	2	1.2	
North Carolina	1	0.6	
North Dakota	3	1.8	
Ohio	8	5.0	
Oklahoma	6	3.7	
Oregon	2	1.2	
Pennsylvania	7	4.4	
Puerto Rico	1	0.6	
Rhode Island	0	0.0	
South Carolina	2	1.2	
South Dakota	2	1.2	
Tennessee	1	0.6	
Texas	25	15.6	
Utah	1	0.6	
Vermont	0	0.0	
Virginia	2	1.2	
Washington	7	4.4	
West Virginia	1	0.6	
Wisconsin	7	4.4	

The greatest limitation of this study was response rate, with a total of 160 complete responses being received between both data collection methods (i.e., email recruitment and Facebook post). Therefore, results of this study cannot be generalized beyond those who responded but considering the purpose of this study to validate a list of preservice SBAE teacher dispositions, the results should be considered transferable. The research team recommends transferability of results given the national scope of this study (i.e., 40 states and 1 territory represented) with the majority of respondents being traditionally certified SBAE teachers (81.9%) with six or more years of experience (65.0%).

Data Analysis

The first research objective employed descriptive statistics (i.e., mean and standard deviation) in SPSS Version 28. Mean scores were established based on the six-point Likert-type scale of agreement where 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Somewhat Disagree*, 4 = *Somewhat Agree*, 5 = *Agree*, and 6 = *Strongly Agree*. Principal component analysis (PCA) was used to address the second research objective using SPSS Version 28. PCA was used to convert the items identified by Claflin et al. (2024) into a questionnaire to measure preservice SBAE teacher dispositions, while also reducing the number of items into related factors (Costello & Osborne, 2005; Field, 2018). A Varimax rotation was implemented within the PCA with the assumption that the 84-items were correlated based off the development of the items (Abdi, 2003; Field, 2018). Kaiser-Meyer-Olkin (KMO) values of sampling adequacy were evaluated from the PCA output, with a minimum acceptable value of 0.6 (Cerny & Kaiser, 1977). Additionally, eigenvalues (greater than 1.0), parallel analysis (above parallel), and communalities (greater than 0.5) were assessed to determine the retention of components and items for the final dispositions list (O'Connor, 2000).

As threats to validity and reliability are regularly of concern in component development (Privitera, 2017), the study began with a valid list of 84-items developed by Claflin et al. (2024); therefore, the reduced components developed within this study resulted in a valid group of components related to essential SBAE teacher dispositions. The use of PCA furthers construct validity by helping to operationalize the items within the components (Privitera, 2017). The third research objective aimed to address reliability of the validated components, focusing on the internal consistency of the resulting PCA items based on Cronbach's alpha values (Privitera, 2017). Cronbach's alpha levels can range from zero to one, with any value at or above 0.7 being considered reliable (BrckaLorenz et al., 2013).

Findings

Research Objective 1: Identify the Importance of SBAE Teacher Disposition Components

Participants were asked to identify the importance of each of the 84 identified teacher dispositions (Claflin et al., 2024) based on the item stem, the following dispositions are important for preservice SBAE teachers to exhibit. Descriptive statistics (i.e., mean and standard deviation) are reported in Table 2 for each of the 84 teacher disposition items. Mean scores ranged from a low of 4.80 ($SD = 0.92$) to a high of 5.81 ($SD = 0.41$) on a six-point scale of agreement, indicating responses of *agree* (5) or *strongly agree* (6) from participating SBAE teachers.

Table 2

Mean Importance of SBAE Teacher Dispositions (n = 160)

Identified Disposition	Mean	SD
I display academic integrity.	5.81	0.41
I have a strong work ethic.	5.80	0.67
I advocate for the importance of my content area.	5.78	0.44
I make students feel valued.	5.77	0.47
I am genuine in my words and actions.	5.77	0.43
I am trusted to do the right thing.	5.77	0.44
I build and maintain positive relationships.	5.77	0.44
I maintain confidentiality.	5.75	0.45
I follow laws and regulations.	5.75	0.45
I tell the truth.	5.74	0.52
I hold students accountable.	5.74	0.48
I follow through on responsibilities.	5.71	0.48
I advocate for what students need to be successful.	5.70	0.50
I listen.	5.70	0.51
I adhere to the code of ethics.	5.70	0.47
I value knowledge and educational experiences.	5.68	0.51
I have the ability to lead students.	5.67	0.50
I am dedicated to teaching and learning.	5.66	0.51
I am professional in my interactions.	5.65	0.50
I am adaptable.	5.65	0.53
I display a positive attitude toward learning.	5.64	0.49
I am independent/take initiative/self-motivated/take action to solve problems.	5.64	0.53
I manage time appropriately.	5.63	0.56
I am on time for class/observations/meetings/etc.	5.63	0.58
I have a growth mindset.	5.61	0.56
I am able to work with others.	5.60	0.55
I am able to build and maintain positive rapport.	5.59	.55
I believe all students can learn.	5.59	0.60
I use appropriate verbal communication skills.	5.56	0.56
I understand expectations and am willing to work to meet them.	5.56	0.59
I am receptive to feedback.	5.56	0.54
I meet deadlines.	5.55	0.62
I am concerned for the well-being of others.	5.55	0.56
I see the big picture.	5.54	0.61
I respect learners as individuals with unique backgrounds, skills abilities, interests, and perspectives, etc.	5.53	0.57
I advocate for myself (communicates my needs).	5.53	0.67
I am able to recognize strengths in all students.	5.52	0.61
I use appropriate non-verbal communication skills.	5.51	0.57
I identify personal responsibility in conflict and problem situations.	5.51	0.57
I am able to manage change.	5.51	0.57
I am patient.	5.50	0.61
I am considerate of others.	5.49	0.58

I am organized/maintain accurate records/complete quality work.	5.49	0.60
I am self-aware.	5.49	0.56
I use appropriate written communication skills.	5.48	0.60
I accept fair consequences.	5.48	0.63
I participate in professional development.	5.48	0.70
I use unique classroom ideas/thinks outside the box.	5.48	0.69
I am helpful and service minded.	5.48	0.56
I seek to understand perspectives and differences.	5.47	0.65
I empower others.	5.47	0.59
I communicate absences.	5.46	0.62
I use appropriate digital communication skills.	5.45	0.65
I ask for help.	5.45	0.69
I am task-oriented/sets goals.	5.44	0.68
I am inquisitive.	5.44	0.61
I maintain a positive attitude.	5.44	0.66
I am strategic in the way I think and plan.	5.44	0.64
I am focused on learning as an individual (vs. student learning or learning in general).	5.44	0.66
I am able to maintain emotional control.	5.43	0.67
I am open to diverse ideas and opinions.	5.42	0.68
I recognize my own biases.	5.42	0.63
I resolve conflicts/approach challenging conversations.	5.40	0.62
I assess situations from multiple perspectives (not cultural perspectives necessarily).	5.40	0.61
I initiate creative solutions to problems.	5.39	0.67
I see and focus on the good in people.	5.39	0.64
I am my authentic self.	5.39	0.76
I delegate appropriately.	5.38	0.62
I support the work of others.	5.38	0.64
I contribute to the group.	5.36	0.63
I am responsive (responds to emails, etc.).	5.36	0.65
I am driven to collaborate (seeks input from others).	5.35	0.69
I am innovative.	5.34	0.73
I am able to understand others' feelings.	5.34	0.67
I use self-disclosure appropriately.	5.33	0.71
I embrace and celebrate diversity (i.e., ability, race, SES, culture, gender, etc.).	5.28	1.00
I take a systems-thinking approach to solving problems – I see how the parts of a system fit and work together.	5.23	0.74
I use systematic processes to solve problems (appropriate data, etc.).	5.21	0.62
I take responsibility for student learning.	5.21	0.83
I build consensus within a group.	5.11	0.76
I meet the school dress code policies.	4.93	1.04
I show interest in class/observations.	4.84	0.81
I participate in meetings/class/observations/PLC.	4.80	0.90
I am present for entire class/observations/etc.	4.80	0.92

Note. Items are ordered based on mean score, where 1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Somewhat Disagree*, 4 = *Somewhat Agree*, 5 = *Agree*, and 6 = *Strongly Agree*.

Research Objective 2: Determine the Essential Factors Related to SBAE Teacher Dispositions

Although all 84 items were deemed important (see Table 2), the list (see Table 3) was analyzed using a PCA to determine the essential components related to SBAE teacher dispositions. Specifically, the PCA provided a reduction of items while developing factors to account for maximum variance. The initial 84 dispositions are categorized in Table 3 with the corresponding item numbers that will be used moving forward in the PCA.

Table 3*Categorized Dispositions of SBAE Teachers*

Category	Identified Disposition	Item Number
Timeliness/Punctuality	I meet deadlines.	T_1
	I am on time for class/observations/meetings/etc.	T_2
Attendance	I am present for entire class/observations/etc.	A_1
Commitment to Students' Learning	I believe all students can learn.	CS_1
	I take responsibility for student learning.	CS_2
	I advocate for what students need to be successful.	CS_3
Diversity, Equity, and Inclusion	I embrace and celebrate diversity (i.e., ability, race, SES, culture, gender, etc.).	DEI_1
	I am able to recognize strengths in all students.	DEI_2
	I recognize my own biases.	DEI_3
	I seek to understand perspectives and differences.	DEI_4
	I am open to diverse ideas and opinions.	DEI_5
	I respect learners as individuals with unique backgrounds, skills abilities, interests, and perspectives, etc.	DEI_6
Ability to Communicate	I listen.	AC_1
	I use appropriate verbal communication skills.	AC_2
	I use appropriate written communication skills.	AC_3
	I use appropriate digital communication skills.	AC_4
	I use appropriate non-verbal communication skills.	AC_5
Reliable/Responsible	I am responsive (responds to emails, etc.).	R_1
	I ask for help.	R_2
	I communicate absences.	R_3
	I am independent/take initiative/self-motivated/take action to solve problems.	R_4
	I am organized/maintain accurate records/complete quality work.	R_5
	I follow through on responsibilities.	R_6
	I manage time appropriately.	R_7
	I have a strong work ethic.	R_8
	I am task-oriented/sets goals.	R_9

Emotional Maturity	I am able to maintain emotional control.	EM_1
	I am patient.	EM_2
	I use self-disclosure appropriately.	EM_3
	I identify personal responsibility in conflict and problem situations.	EM_4
	I accept fair consequences.	EM_5
	I advocate for myself (communicates my needs).	EM_6
	I resolve conflicts/approach challenging conversations.	EM_7
	I am professional in my interactions.	EM_8
Creative	I am inquisitive.	CR_1
	I initiate creative solutions to problems.	CR_2
	I am innovative.	CR_3
	I use unique classroom ideas/thinks outside the box.	CR_4
Collaborative	I am able to work with others.	C_1
	I am driven to collaborate (seeks input from others).	C_2
	I support the work of others.	C_3
	I build consensus within a group.	C_4
	I am helpful and service minded.	C_5
	I contribute to the group.	C_6
Commitment to the Profession	I am dedicated to teaching and learning.	CP_1
	I understand expectations and am willing to work to meet them.	CP_2
	I value knowledge and educational experiences.	CP_3
	I participate in professional development.	CP_4
	I advocate for the importance of my content area.	CP_5
Engaged and Attentive	I participate in meetings/class/observations/PLC.	E_1
	I show interest in class/observations.	E_2
Appearance and Attire	I meet the school dress code policies.	AA_1
Relatable/Relationships	I build and maintain positive relationships.	RE_1
	I am able to build and maintain positive rapport.	RE_2
Empathetic/Caring/ Compassionate/ Respectful	I am considerate of others.	EC_1
	I see and focus on the good in people.	EC_2
	I am able to understand others' feelings.	EC_3
	I am concerned for the well-being of others.	EC_4
	I make students feel valued.	EC_5
Flexible	I am able to manage change.	F_1
	I am adaptable.	F_2
Reflective	I am receptive to feedback.	RF_1
	I am self-aware.	RF_2
Genuine/Authentic	I am my authentic self.	G_1
	I am genuine in my words and actions.	G_2

	I am trusted to do the right thing.	G_3
Integrity	I follow laws and regulations.	I_1
	I tell the truth.	I_2
	I display academic integrity.	I_3
	I maintain confidentiality.	I_4
	I adhere to the code of ethics.	I_5
Lifelong learner	I display a positive attitude toward learning.	LL_1
	I have a growth mindset.	LL_2
	I am focused on learning as an individual (vs. student learning or learning in general).	LL_3
Leadership	I empower others.	L_1
	I delegate appropriately.	L_2
	I have the ability to lead students.	L_3
	I hold students accountable.	L_4
Positive attitude	I maintain a positive attitude.	P_1
Problem Solving	I assess situations from multiple perspectives (not cultural perspectives necessarily).	PS_1
	I see the big picture.	PS_2
	I take a systems-thinking approach to solving problems – I see how the parts of a system fit and work together.	PS_3
	I use systematic processes to solve problems (appropriate data, etc.).	PS_4
	I am strategic in the way I think and plan.	PS_5

The initial PCA resulted in 19 components with eigenvalues greater than 1.0 and an acceptable KMO measure of 0.87 (Cerny & Kaiser, 1977). The eigenvalues were compared to parallel analysis which indicated the need for only 18 components. The data were then analyzed using a PCA with Varimax rotation, fitting the 84-items to 18 components. Component loadings and communalities of the rotated matrix were evaluated to determine the retention of items. For items to be retained, a component loading of 0.6 or greater on one component was set, resulting in the retention of 28-items. Those 28-items were then re-analyzed using an additional PCA to verify the number of components related to SBAE teacher dispositions. The analysis resulted in a KMO value of 0.88 with items loading across eight components, five of which were above parallel analysis. Therefore, the 28-items were then analyzed using a PCA with Varimax rotation fit to five components. Table 4 displays the output from this final PCA analysis (i.e., component loadings and communalities).

Table 4*Retained PCA Communalities and Component Loadings (28 items, n = 160)*

Items	Component					Communality
	1	2	3	4	5	
L_2					.623	.52
CP_4			.414			.44
L_4					.645	.55
CS_1	.387				.458	.44
EM_5				.350	.624	.68
LL_1	.402					.53
R_4		.627				.53
CR_4					.603	.65
G_2	.360			.628		.60
I_1		.311	.384			.50
E_2	.341		.740			.74
A_1			.832			.77
I_2				.766		.63
G_3				.742		.65
CP_5		.665				.52
PS_2	.363	.473				.50
AC_2	.403	.544				.59
R_7		.463	.339			.50
EC_4	.759					.69
EC_3	.665	.349				.64
PS_3	.470	.312				.46
EC_2	.734					.61
RE_2	.668	.403				.67
DEI_3	.662					.64
T_2		.420		.553		.62
R_8		.537		.374		.47
E_1	.341		.781			.81
DEI_6	.793					.72

Note. Factor loading below .300 are not displayed; Extraction values are based on communalities; Items with a strikethrough were not retained.

The PCA fit to five components resulted in 18 of the 28 items loading above a 0.6 (see Table 3), which accounted for 59.6% of the explained variance. Table 5 outlines the five components and corresponding items for the validated list of dispositions.

Table 5

Retained Items and Emerging Components (18 items)

Component Title	Item	Corresponding Item Description
1. Empathetic and Considerate	EC_1	I am concerned for the well-being of others.
	EC_2	I am able to understand others' feelings.
	EC_3	I see and focus on the good in people.
	EC_4	I am able to build and maintain positive rapport.
	EC_5	I recognize my own biases.
	EC_6	I respect learners as individuals with unique backgrounds, skills abilities, interests, and perspectives, etc.
2. Directed	D_1	I am independent/take initiative/self-motivated/take action to solve problems.
	D_2	I advocate for the importance of my content area.
3. Engaged and Attentive	EA_1	I show interest in class/observations.
	EA_2	I am present for the entire class/observations/etc.
	EA_3	I participate in meetings/class/observations/PLC.
4. Personal Integrity	PI_1	I am genuine in my words and actions.
	PI_2	I tell the truth.
	PI_3	I am trusted to do the right thing.
5. Emotional Maturity	EM_1	I delegate appropriately.
	EM_2	I hold students accountable.
	EM_3	I accept fair consequences.
	EM_4	I use unique classroom ideas/thinks outside the box.

Note. Item numbers presented in this table will be used from this point forward.

Research Objective 3: Establish the Reliability of the Specific Components within the Pre-Service SBAE Teacher Dispositions List

The 18-item validated dispositions list resulted in an overall Cronbach's alpha of 0.98, which considered to be acceptable (Nunnally, 1978). Additionally, the Cronbach's alpha coefficients were considered for each individual component. The *Empathetic and Considerate* component included six items and resulted in a Cronbach's alpha of 0.87. The second component, *Directed*, only has two items, which is often considered problematic and reporting a Cronbach's alpha is meaningless (Eisinga et al., 2013), but it resulted in a Cronbach's alpha of 0.56. *Engaged and Attentive* had a Cronbach's alpha of 0.87 across three items. The fourth component, *Personal Integrity*, included three items and resulted in a Cronbach's alpha of 0.75. The final component, *Emotional Maturity*, spanned four items and had a Cronbach's alpha of 0.70. Four of the five components resulted in an acceptable Cronbach's alpha level (i.e., 0.70 or greater) according to Nunnally (1978). Although one component fell below the desired level, the two items are part of the complete 18-item list measuring SBAE teacher dispositions, and the removal of any items lowers the overall Cronbach's alpha coefficient. Therefore, all 18-items were retained as part of the validated and reliable dispositions list.

Conclusions, Implications, and Recommendations

Assessment of preservice teacher dispositions is required for accreditation of teacher preparation programs (CAEP) and is important for the development of teachers (INTASC). Yet, there is a lack of consistency in SBAE teacher preparation preservice dispositions assessments (Claflin et al., 2024). The purpose of this study was to validate a list of dispositions to be used with preservice SBAE teachers, as well as identify the essential components related to SBAE teacher dispositions.

The resulting valid scale reduced the initial item pool from 84 items to 18 items and from 22 components to five components. The resulting components included *Empathetic* and *Considerate, Directed, Engaged and Attentive, Personal Integrity*, and *Emotional Maturity*. According to the results of the PCA, the initial pool of 84 items can now be assessed within these five components. This is further evidenced by evaluating the items within each factor. In comparing the initial components to the final components, none of the final components share any items from the initial components. This leads us to believe the PCA did accurately reduce the 84 items into the five final components. The much-shortened list greatly improves the scale's usefulness in practice as it reduces cognitive load and survey fatigue (Galesic & Bosnjak, 2009).

Because assessing preservice teacher dispositions is left to each institution, developing valid and reliable measurements for dispositions is difficult (Borko et al., 2007; Flowers, 2006; Saltis et al., 2020; Schulte et al., 2005). Further, addressing the nuances associated with preparing SBAE teachers further convolute dispositions assessments. The 18-item, valid, and reliable measure developed through this study can be shared with SBAE teacher preparation programs and institutions that are unable to develop their own unique instrument for the assessment of preservice dispositions.

Overwhelmingly, participants deemed all 84-items as important on the six-point scale of agreement. According to DeVellis (2017), a lack of variance in responses can be a cause for concern. DeVellis (2017) recommends item means fall around the midpoint to ensure adequate variance. The resulting item means in this study ranged from $M = 4.80$ to $M = 5.81$ on a six-point scale. However, this aligns with the development of the initial instrument (Claflin et al., 2024) through the current practices being used by SBAE teacher preparation programs to measure student dispositions. Therefore, it is essential to consider the complete list of dispositions developed by Claflin et al. (2024) as part of an SBAE teacher preparation program when working to establish program specific disposition measures. Although the complete 84-item list is valuable, perhaps SBAE teacher preparation faculty should consider the valid scale spanning five components as the primary areas of focus as they prepare SBAE teacher aspirants. Often these items are hard to teach, therefore it is essential that faculty, mentor teachers, and cooperating teachers model these essential professional dispositions. While the concern could be raised about the ability to develop these dispositions by modeling alone, the 18 validated items identified in this study further support sector-specific human capital development (Smith, 2010) and effective teaching practices (Eck et al., 2020; Rosenshine & Furst, 1971) which are regularly taught in SBAE teacher preparation programs.

Sample size and response rate were limiting factors within this study, as the total number of usable responses ($n = 160$) fell below the recommended 10:1 ration of responses to items (Comrey & Lee, 1992). Although this was of concern, the study had representation from 160 in-service SBAE teachers spanning 40 states and one territory with varying personal and professional characteristics, which resulted in acceptable KMO values for the PCA (Cerny & Kaiser, 1977) and Cronbach's alpha levels for the instrument reliability (BrckaLorenz et al., 2013). Therefore, it can be concluded that the scale is valid (i.e., measures what it is intended to measure) and reliable (i.e., consistent and repeatable) following the recommendations of Privitera (2017). Ultimately, the development and validation of this scale was established to further the human capital (i.e., education, skills, training, and experiences) development of preservice SBAE teachers.

As such, the *School-Based Agricultural Education Teacher Dispositions Core* (SBAE-TDC) is situated within human capital theory, connecting to both the development of knowledge and skills of SBAE teacher aspirants (Eck et al., 2021) and the essential employability skills within the profession (Knight & Yorke, 2003; Robinson & Baker, 2013). Fostering the development of these dispositions through modeling behaviors, cooperating/mentor teacher interaction, and preservice teacher self-evaluation allows teacher preparation programs to make essential connections to InTASC and CAEP standards as part of their credentialing (CAEP, 2022; Council of Chief State School Officers, 2013). To accomplish the essential human capital growth during the teacher preparation program and clinical teaching experience, modeling of the 18-items across the five components is pivotal in furthering the professional dispositions (i.e., *Empathetic and Considerate, Directed, Engaged and Attentive, Personal Integrity, and Emotional Maturity*) of SBAE teacher aspirants.

To strengthen the validity and reliability of the scale and following the guidelines of Osborne and Fitzpatrick (2012), we recommend replicating this study with preservice teachers, re-running the PCA, and comparing the results of the two samples. As we work to narrow the focus of an instrument to preservice SBAE teachers, validating the scale to that population is critical.

Discussion

Considering practical application of the SBAE-TDC, it is recommended that SBAE teacher preparation faculty consider the specific needs of their department and students related to the implementation to measure preservice SBAE teacher dispositions. Specifically, the 18-item validated core list (see Table 5) should be used as the starting point for evaluating dispositions, as some programs already have procedures in place to evaluate dispositions, while others are looking for a potential tool to do just that. For example, the 18-item SBAE-TDC could be used along with other disposition items deemed essential by Claflin et al. (2024) or other departmental requirements. Table 6 provides an example of the SBAE-TDC with an additional seven items based on programmatic needs.

Table 6

Example Preservice Evaluation using the SBAE-TDC (25 items)

Component Title	Item	Corresponding Item Description
1. Empathetic and Considerate	EC_1	I am concerned for the well-being of others.
	EC_2	I am able to understand others' feelings.
	EC_3	I see and focus on the good in people.
	EC_4	I am able to build and maintain positive rapport.
	EC_5	I recognize my own biases.
	EC_6	I respect learners as individuals with unique backgrounds, skills abilities, interests, and perspectives, etc.
2. Directed	D_1	I am independent/take initiative/self-motivated/take action to solve problems.
	D_2	I advocate for the importance of my content area.
3. Engaged and Attentive	EA_1	I show interest in class/observations.
	EA_2	I am present for the entire class/observations/etc.
	EA_3	I participate in meetings/class/observations/PLC.
4. Personal Integrity	PI_1	I am genuine in my words and actions.
	PI_2	I tell the truth.

	PI_3	I am trusted to do the right thing.
5. Emotional Maturity	EM_1	I delegate appropriately.
	EM_2	I hold students accountable.
	EM_3	I accept fair consequences.
	EM_4	I use unique classroom ideas/thinks outside the box.
6. Additional Programmatic Items		I am professional in my interactions.
		I am organized/maintain accurate records/complete quality work.
		I follow through on responsibilities.
		I seek to understand perspectives and differences.
		I maintain a positive attitude.
		I display academic integrity.
		I am receptive to feedback.

Note. This list of items includes optional additions based on program needs (See component 6).

When used as an assessment, the SBAE-TDC is recommended to not exceed 25 items with the inclusion of potential additional programmatic requirements (see Table 6) to maintain ease of use. SBAE teacher preparation faculty are encouraged to tailor the SBAE-TDC into an instrument for their own programmatic needs and have preservice SBAE teachers self-assess using the SBAE-TDC throughout their program. Considering the student teaching experience, preservice SBAE teachers should self-evaluate to reflect on their practice but is also recommended that cooperating teachers and university supervisors also evaluate the student teacher using the SBAE-TDC. The regular use of the scale will allow SBAE teacher preparation programs to further prepare preservice teachers in education with the necessary skills and dispositions to be successful. The SBAE-TDC is not recommended to be used as a sorting gate to remove students from a teacher preparation program, instead it should be a way to document individual human capital development of SBAE teacher aspirants and encourage continual professional development. If teacher preparation faculty document a continual lack of professional dispositions during an individual's journey through and SBAE teacher preparation program, we recommend that they develop a plan of improvement to hold the student accountable for essential dispositions development prior to the student teaching internship and degree completion.

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