Perceived Resources and Needs for Developing Effective Agricultural Education Programs

Joe Ramstad, Iowa State University
Scott Smalley, Iowa State University

Introduction and Literature Review

The three-component model of agricultural education offers school-based agricultural education (SBAE) programs a benchmark for organizing student opportunities related to: 1) classroom and laboratory instruction, 2) leadership development and the National FFA Organization, and 3) experiential learning and supervised agricultural experience (SAE) (Croom, 2008; Hainline & Smalley, 2023; Phipps et al., 2008). There has been limited quantitative research investigating the philosophical underpinnings and day-to-day applications of the three-component model from a program-level to determine the characteristics that make a program high-caliber, and the extent to which programs engage in these components, or potentially other essential components of a SBAE program which are not discussed as much; this study seeks to fill this gap in the literature.

Previous work has examined isolated components of program design, specifically in the three traditional components. For example, in the classroom setting, given the vast range of topics and skills that can be taught, the tasks associated with curriculum and instruction have been cited as major barriers for SBAE teachers (Ball et al., 2007; Boone & Boone, 2009; Heath-Camp et al., 1992; Joerger, 2002; Smith & Smalley, 2018; Traini et al., 2021). The literature also suggests that effective teaching practices within the classroom setting each day are essential to maintaining a well-balanced program, especially considering the already high workload, expectations, and demands placed on educators that are unique to SBAE (Boone & Boone, 2007; Harper et al., 1990; Lemons et al., 2015). Despite this, quantitative research has not examined the implementation of these components across a total program. To address this gap in the literature, this study examines the extent to which SBAE program leaders perceive their implementation of the characteristics that experts have identified as necessary for an effective SBAE program, building on literature and prior work pertaining to the tasks and responsibilities associated with SBAE teaching roles, and applying these findings to the total SBAE program level. Findings of this study can be utilized to see if what SBAE programs report doing is in congruence with what SBAE experts perceive as important characteristics of an effective SBAE program.

Conceptual Framework

Roberts and Ball's (2009) framework outlines the importance of students gaining relevant agricultural knowledge based on industry needs, and the relationship between learners and educators. The knowledge and skills students gain in classroom contexts, coupled with FFA and experiential learning opportunities in the three-component model (Croom, 2008), assist in meeting the overarching goal of developing lifelong learners, agriculturally literate citizens, and a skilled workforce (The National Council for Agricultural Education, 2023). To meet these goals, SBAE programs must be strategic in how they prioritize and approach teaching and learning, and are encouraged to leverage the industry expertise of stakeholders or an advisory board (Masser et al., 2014; Myers et al., 2005; Sorensen et al., 2010; Taylor et al., 2017).

Purpose and Objectives

The purpose of this study was to evaluate SBAE programs' ability to implement the effective program characteristics identified by experts in a separate study. Objectives include:

1. To identify the resources SBAE programs have access to, or perceive needing access to, in order to exhibit the characteristics of an effective SBAE program.
2. To identify needs for establishing, facilitating, and managing an effective SBAE program.

Methods

The instrument within this study was adopted based on the findings of a Delphi study, where a panel of 40 experts reached consensus on characteristics deemed necessary for SBAE programs to demonstrate in order to be effective. After obtaining IRB approval, the study was reviewed by an expert panel (Thyer, 2010). To fulfill the purpose and objectives of the study, it was determined that a Borich (1980) model would be most effective for evaluating the extent to which these characteristics are being exhibited, along with identifying SBAE teacher needs for meeting these characteristics. The instrument was distributed via Qualtrics to a stratified random sample of 210 SBAE educators representing each of the six NAAE regions; prospective respondents were reminded to participate in the study three times (Dillman et al., 2014). A total of 55 teachers provided responses, yielding a response rate of 26.19%. Identifiers were isolated from individual responses to protect their identities (Creswell & Creswell, 2018). SPSS and a mean weighted discrepancy score (MWDS) calculator was used to analyze data. MWDS is calculated by adding all weighted discrepancy scores for each item and dividing by the number of responses. A higher MWDS indicates larger discrepancies between the perceived importance and abilities among respondents—calling for a greater need for training (Borich, 1980). In addition to review from an expert panel to achieve face validity, content validity was achieved through an overall Cronbach's alpha coefficient of 0.977. Since this value is above the recommended value of 0.7 prescribed by Nunnally (1978), the instrument is considered reliable.

Results

For each of the characteristics across the themes, the MWDS was calculated, and the characteristics were ranked from highest to lowest scores within each theme (Tables 1 through 6). A higher MWDS score and a ranking closer to 1 indicates higher need for additional training and development, as this would be attributed to teachers' scoring of their perceived importance as higher than their ability to perform or execute that characteristic. Objective 1 identified the resources SBAE programs have access to, or perceive needing access to, in order to exhibit the characteristics of an effective program. Educators reported having the greatest ability to access a classroom ($\bar{x} = 4.78$; $\sigma = 0.58$), a supportive community ($\bar{x} = 4.24$; $\sigma = 0.81$), and the resources to maintain safe facilities ($\bar{x} = 4.18$; $\sigma = 0.89$). However, teachers reported the least access to, and most discrepancy among having, a healthy budget to support their programs ($\bar{x} = 3.55$; $\sigma = 1.27$; MWDS = 6.51) and financial support for facility maintenance responsibilities ($\bar{x} = 3.49$; $\sigma = 1.19$; MWDS = 5.95). Full findings can be found in Table 1.

Table 1

Resource Characteristics (n = 51)

	Importance		Ability		*MWDS*	Rank
	$\bar{x}$	σ	$\bar{x}$	σ		
Healthy budget to support a hands-on program	4.88	0.38	3.55	1.27	6.51	1
Financial support for facility responsibilities	4.75	0.59	3.49	1.19	5.95	2
Financial support for program planning tasks	4.76	0.43	3.67	1.16	5.23	3
Financial support to engage in PD	4.80	0.53	3.76	1.18	4.99	4

Financial support for curriculum tasks	4.69	0.58	3.63	1.23	4.96	5
Access to industry-relevant teaching materials	4.67	0.65	3.63	1.18	4.85	6
Financial support for FFA responsibilities	4.82	0.43	3.88	1.18	4.54	7
Financial support for program evaluation tasks	4.53	0.70	3.59	1.17	4.26	8
Financial support for SAE responsibilities	4.59	0.73	3.71	1.25	4.05	9
Access to instructional technology	4.78	0.50	4.10	1.08	3.28	10
Supportive community	4.90	0.36	4.24	0.81	3.27	11
Resources to maintain safe facilities	4.86	0.40	4.18	0.89	2.91	12
Access to a classroom	4.84	0.61	4.78	0.58	0.48	13

Objective 2 aimed to identify needs for establishing, facilitating, and managing an effective SBAE program. These needs were divided among five key areas: curriculum, FFA, SAE, program evaluation, and marketing. Tables 2 through 6 present these findings. In curriculum and classroom instruction, educators reported the greatest needs in having up-to-date curriculum (MWDS = 4.05), extending learning beyond the classroom (MWDS = 3.88), and emphasizing real-world experiences (MWDS = 3.83). The full findings are included in Table 2.

Table 2

Curriculum or Classroom Characteristics (n = 55)

	Importance		Ability		*MWDS*	Rank
	$\bar{x}$	σ	$\bar{x}$	σ		
Up-to-date curriculum	4.55	0.81	3.65	0.97	4.05	1
Extends learning beyond the classroom	4.64	0.73	3.80	0.93	3.88	2
Emphasizes real-world learning experiences	4.78	0.69	3.98	0.97	3.83	3
Emphasizes problem-solving skills	4.58	0.76	3.87	0.88	3.25	4
Emphasizes hands-on learning	4.78	0.63	4.11	0.81	3.22	5
Curriculum aligned with workforce needs	4.31	0.92	3.60	1.06	3.06	6
Emphasizes employability skill development	4.64	0.73	3.98	0.93	3.03	7
Facilitating laboratory instruction	4.45	0.86	3.78	0.98	3.00	8
Frequent feedback for student learning	4.16	0.86	3.47	0.90	2.88	9
Advanced coursework opportunities	3.85	0.99	3.18	1.04	2.59	10
Differentiation for student learning	4.09	0.95	3.49	0.92	2.45	11
Emphasizes technical skill development	4.25	0.82	3.71	0.85	2.32	12
Student-centered curriculum	4.29	0.92	3.80	0.97	2.11	13
Intentional scaffolding of curriculum	3.98	0.91	3.49	0.96	1.95	14
Emphasizes career preparation	4.45	0.81	4.04	0.94	1.86	15
Authentic student assessment	4.09	0.91	3.64	0.80	1.86	16
Facilitating classroom instruction	4.44	0.81	4.04	0.94	1.77	17
Community-driven curriculum	3.82	1.04	3.38	1.07	1.67	18
Rigorous curriculum	3.93	0.98	3.56	0.86	1.43	19
Curriculum aligned with AFNR standards	4.07	1.05	3.73	1.06	1.41	20
Emphasizes transferable/"life" skills	4.31	0.96	4.00	0.90	1.33	21
Driven by teaching and learning theory	3.76	0.86	3.49	0.88	1.03	22
Emphasizes career exploration	4.29	0.81	4.05	0.83	1.01	23
Introductory coursework opportunities	4.16	0.90	3.95	0.97	0.91	24
Courses aligned with AFNR pathways	4.09	1.04	4.04	0.96	0.22	25

In FFA, educators reported the greatest need for assistance in finding opportunities to facilitate civic engagement with their students (MWDS = 3.17), cultivating a student-led chapter (MWDS = 2.78), and having their membership reflect the demographics of the school (MWDS = 2.59). The most important characteristics identified by teachers was having a chapter that recognizes student success ($\bar{x}$ = 4.75; σ = 0.43) and is active ($\bar{x}$ = 4.70; σ = 0.54). They also acknowledged the greatest ability to recognize student success ($\bar{x}$ = 4.34; σ = 0.83). Full findings are in Table 3.

Table 3
FFA Characteristics (n = 53)

	Importance		Ability		*MWDS*	Rank
	$\bar{x}$	σ	$\bar{x}$	σ		
Opportunities for civic engagement	4.42	0.63	3.70	1.01	3.17	1
Student-led FFA chapter	4.60	0.66	4.00	0.96	2.78	2
Membership represents school demographics	4.28	1.01	3.68	1.09	2.59	3
Emphasizes student leadership development	4.64	0.52	4.11	0.89	2.45	4
Active FFA chapter	4.70	0.54	4.19	1.02	2.39	5
Social-emotional development opportunities	4.19	0.92	3.64	1.02	2.29	6
Recognition of student success	4.75	0.43	4.34	0.83	1.97	7

Despite recognizing the greatest ability to embed SAE into student coursework ($\bar{x}$ = 3.51; σ = 1.14), documentation of student SAE records has the greatest discrepancy between perceived importance and ability (MWDS = 3.88). Further, documentation of records was also cited as the most important characteristic ($\bar{x}$ = 4.28; σ = 0.84). Full findings are presented in Table 4.

Table 4
SAE Characteristics (n = 53)

	Importance		Ability		*MWDS*	Rank
	$\bar{x}$	σ	$\bar{x}$	σ		
Documentation of student SAE records	4.28	0.84	3.38	1.04	3.88	1
Every student has an SAE	4.13	1.06	3.32	1.16	3.35	2
SAEs are embedded into courses	4.23	0.91	3.51	1.14	3.03	3

Assessment and evaluation can guide the growth and development of a SBAE program. Teachers reported the greatest need for engaging external partners in providing feedback (MWDS = 3.96), utilizing ongoing assessment to drive decision-making (MWDS = 3.81), and conducting an annual review of the program's goals, mission, and needs (MWDS = 2.93). However, educators recognize the most importance in having goals to guide their growth ($\bar{x}$ = 4.55; σ = 0.67) and striving for continuous improvement ($\bar{x}$ = 4.51; σ = 0.64). Full findings can be found in Table 5.

Table 5
Program Organization, Evaluation, and Assessment Characteristics (n = 51)

	Importance		Ability		*MWDS*	Rank
	$\bar{x}$	σ	$\bar{x}$	σ		
External partners provide feedback	4.29	0.83	3.37	1.31	3.96	1
Ongoing assessment drives decision-making	4.41	0.70	3.55	1.06	3.81	2
Annual review of goals/mission/needs	4.27	0.80	3.59	1.17	2.93	3

Development based on goals/mission/vision	4.39	0.72	3.78	0.90	2.67	4
Program has goals for continuous growth	4.55	0.67	4.00	0.82	2.50	5
Internal partners provide feedback	4.22	0.97	3.63	1.06	2.48	6
Program is held accountable at the local level	4.53	0.70	4.02	0.93	2.31	7
Utilizes clear processes and procedures	4.45	0.73	4.00	0.80	2.01	8
Program is driven by continuous improvement	4.51	0.64	4.16	0.78	1.59	9

In program marketing, educators reported the greatest need for developing a plan to market the program to community and school stakeholders (MWDS = 3.61), but report having the greatest importance ($\bar{x}$ = 4.58; σ = 0.73) and ability ($\bar{x}$ = 4.02; σ = 0.96) to maintain internal communication among students and teachers. Table 6 provides all findings related to marketing.

Table 6

Marketing Characteristics (n = 50)

	Importance		Ability		*MWDS*	Rank
	$\bar{x}$	σ	$\bar{x}$	σ		
A plan to market the program to stakeholders	4.30	0.91	3.46	1.22	3.61	1
Communication to stakeholders	4.32	0.79	3.58	1.11	3.20	2
Internal communication (student, teacher, etc.)	4.58	0.73	4.02	0.96	2.56	3

Conclusions and Recommendations

Objective 1 identified the resources SBAE programs have access to, or perceive needing access to, in order to exhibit the characteristics of an effective program. With a goal of preparing students for workforce needs (Roberts & Ball, 2009), there was a need for additional funding among programs so they can facilitate hands-on experiences featured within the unique content taught within SBAE (Ball et al., 2007). Objective 2 aimed to identify needs for establishing, facilitating, and managing an effective SBAE program. As supported by the literature, educators reported the greatest amount of need in updating their curriculum (MWDS = 4.05) (Myers et al., 2005), engaging external partners (MWDS = 3.96) (Sorensen et al., 2010), and supporting student SAE recordkeeping experiences (MWDS = 3.88) (Hainline & Smalley, 2023).

Future work should seek to address the limitations of this study. One of the key limitations was a lack of participants. While our response rate was consistent with what is expected in an online instrument (Sakshaug et al., 2019), future work should aim to achieve a larger sample size to increase confidence (Creswell & Creswell, 2018). Taking a qualitative approach by conducting interviews with educators can reveal additional context concerning the successes or barriers at play with developing effective SBAE programs. For professional practice, it is recommended to create programs or policies which make funding opportunities more accessible within teachers' demanding schedules. Respondents indicated a need for a healthy budget within their programs, yet faced challenges securing industry-relevant teaching materials or offering experiences aligned with workforce needs. Additional funding has provide teachers with more opportunities for professional development or the physical resources to facilitate these hands-on experiences (Smith & Smalley, 2018) connected to the content and local context of SBAE to prepare students for careers (Roberts & Ball, 2009). Alternatively, developing additional financial resources for educators to more routinely engage in facility and program planning responsibilities would be beneficial, as these were key areas of need.

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