

Determining the Qualities of an Effectively Managed SBAE Program: A Delphi Study

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

Introduction and Literature Review

One of the greatest challenges faced in school-based agricultural education (SBAE) is that each program is as unique as the community in which it finds itself (Croom, 2009; Krieg & Krieg, 2021). Although a SBAE program may look completely different from one school to the next (Roberts & Ball, 2009), the SBAE three-component model has guided the development of opportunities within programs for nearly 100 years (Croom, 2008). This model has been utilized to establish a benchmark for the overarching activities SBAE programs should be doing (Croom, 2008; Phipps et al., 2008; Shoulders & Toland, 2017). The three-component model consists of: 1) classroom and laboratory instruction, 2) leadership development, and 3) experiential learning and supervised agricultural experience (SAE) (Croom, 2008). Further, the National Council for Agricultural Education (2023a) shares, “agricultural education prepares students for successful careers and a lifetime of informed choices in the global agriculture, food, fiber, and natural resources systems.” To fulfill this mission, students must have opportunities to gain skills and knowledge to advance their agricultural literacy and capacity to meet workforce needs (Roberts & Ball, 2009). Identifying attributes which contribute to an effective SBAE program to fulfill the SBAE mission is what lies at the root of this study, as the responsibilities of a SBAE program often extend beyond the three-component model (Smith & Smalley, 2018; Touchstone, 2015). The National Council for Agricultural Education reviews and evaluates the agriculture, food, and natural resources framework (2023b) and national quality program standards (NQPS) (2023c) to ensure programs have guidance and direction in designing, planning, and evaluating their programs. However, there have not been studies examining if the three components of SBAE (Croom, 2008) are in alignment with the recommended present-day characteristics of programs.

Conceptual Framework

Roberts and Ball’s (2009) framework provides an outline of the need for students to gain relevant agricultural knowledge, based on current and emerging industry needs, and the relationship between students and educators. The knowledge and skills students gain and apply through these contexts, coupled with opportunities presented within the three-component model (Croom, 2008) provide the basis for identifying the characteristics of an effective SBAE program. The agricultural context encompasses the SBAE program, which depends upon the local community (Roberts & Ball, 2009). SBAE programs are encouraged to utilize stakeholder groups, such as advisory boards (Masser et al., 2014; Myers et al., 2005; Sorensen et al., 2010; Taylor et al., 2017), to ensure curricula and activities are reflective of the agricultural context.

Purpose and Objectives

The purpose of this study was to evaluate the qualities of effective SBAE programs. Objectives included: 1) To identify the characteristics of an effective SBAE program, and 2) to measure experts’ agreement among the characteristics of an effective SBAE program.

Methods

An IRB-approved Delphi study addressed the purpose and objectives. This technique was developed at the Rand Corporation in the 1940s to obtain the opinions of experts within the field

in an organized manner, and has had wide applications within agricultural education since (Martin & Frick, 1998; Sackman, 1975). Coordinators of SBAE teacher education were contacted to provide expert nominations. From these nominations, 65 experts were emailed; 42 experts from 18 states ultimately participated, achieving a reliability coefficient of 0.9 (Dalkey et al., 1972). Experts included SBAE teacher preparation faculty, state staff, and state supervisors. Identifiers were extracted from responses to ensure anonymity (Helmer, 1966; Sackman, 1975; Skulmoski et al., 2007). A total of 542 expert-solicited characteristics were gathered. We compiled the lists, eliminating duplicate or similar characteristics to generate 174 characteristics across nine themes. Round 2 and 3 consisted of respondents indicating their level of agreement with each characteristic using a scale from 1 (“strongly disagree”) to 6 (“strongly agree”). The questionnaire was piloted; after validity checks and testing reliability (Creswell & Creswell, 2018), it was sent to the expert panel. We evaluated consensus via three criteria: 1) mean scores of greater than 4.80, 2) standard deviations of less than 1.00, and 3) 75% of respondents must have scored the characteristic as a 5 or 6 (Barrios et al., 2014; Buriak & Shinn, 1989; Diamond et al., 2014; Foth et al., 2016). Characteristics which met each of these criteria reached consensus. To maximize response rates, we followed Dillman et al.’s (2009; 2014) recommendations.

Results

Using the Delphi methodology, consensus was achieved on 95 characteristics across nine themes. To address Objectives 1 and 2 of the study, these characteristics, along with means, standard deviations, and the percent agreement among the experts are presented in Tables 1 through 9.

Table 1

Consensus-achieving curriculum or classroom characteristics (n = 25)

Characteristic	μ	σ	Agreement
Opportunity to extend learning beyond the classroom	5.78	.42	100%
Up-to-date curriculum	5.78	.48	98%
Emphasizes real-world learning experiences	5.75	.49	98%
Engagement in laboratory instruction	5.68	.57	95%
Engagement in classroom instruction	5.60	.63	93%
Emphasizes problem-solving skill development	5.60	.63	93%
Frequent feedback for student learning	5.55	.71	93%
Emphasizes hands-on learning	5.53	.60	95%
Emphasizes employability skill development	5.53	.68	90%
Differentiation for student learning	5.50	.68	90%
Curriculum aligned with AFNR standards	5.45	.96	90%
Driven by teaching and learning theory	5.43	.78	88%
Emphasizes career exploration	5.43	.71	88%
Courses aligned with AFNR pathways	5.35	.98	88%
Curriculum aligned with local workforce needs	5.35	.80	85%
Introductory coursework opportunities	5.33	.94	83%
Student-centered curriculum	5.33	.86	85%
Authentic student assessment	5.33	.76	83%
Emphasizes transferable/"life" skill development	5.25	.90	88%
Emphasizes career preparation	5.25	.78	80%
Advanced coursework opportunities	5.23	.86	78%

SCHOOL-BASED AGRICULTURAL EDUCATION

Intentional scaffolding of curriculum	5.20	.99	75%
Community-driven curriculum	5.08	.86	78%
Emphasizes technical skill development	5.03	.89	78%
Rigorous curriculum	4.98	.95	75%

Table 2

Consensus-achieving FFA characteristics (n = 7)

Characteristic	μ	σ	Agreement
Emphasizes student leadership development	5.60	.59	95%
Student-led chapter	5.38	.77	88%
Celebration and recognition of student success	5.38	.74	90%
Membership represents demographics of the school	5.28	.96	83%
Active chapter	5.23	.92	88%
Social-emotional development opportunities	5.15	.83	78%
Opportunities for students to practice civic engagement	5.10	.71	85%

Table 3

Consensus-achieving SAE characteristics (n = 3)

Characteristic	μ	σ	Agreement
SAEs are embedded into courses	5.28	.91	80%
Every student has an SAE	5.28	.99	85%
Documentation of student SAE records	5.05	.90	78%

Table 4

Consensus-achieving teacher characteristics (n = 15)

Characteristic	μ	σ	Agreement
Lifelong learner	5.75	.54	95%
Effective classroom management	5.73	.51	98%
Engages in professional development	5.68	.57	95%
Effective planning skills	5.60	.59	95%
Engaging	5.53	.64	93%
Motivated	5.43	.75	90%
Flexibility	5.35	.74	85%
Dedicated	5.35	.80	85%
Credentialed with adequate training	5.33	.80	90%
Knowledge of the 3-component model	5.30	.85	85%
Well-connected to community	5.23	.80	78%
High expectations	5.20	.97	80%
Organization	5.10	.74	78%
Balance of the 3-component model	5.08	.92	80%
Broad content knowledge	4.98	.97	75%

Table 5

Consensus-achieving resource characteristics (n = 13)

Characteristic	μ	σ	Agreement
Access to a classroom	5.93	.35	98%

SCHOOL-BASED AGRICULTURAL EDUCATION

Resources to adequately maintain safe facilities	5.83	.45	98%
Supportive community	5.60	.81	93%
Financial support for the teacher to fulfill SAE responsibilities	5.53	.78	88%
Financial support for the teacher to engage in PD	5.53	.64	93%
Financial support for the teacher to fulfill FFA responsibilities	5.48	.88	85%
Financial support for the teacher to fulfill program planning tasks	5.45	.78	88%
Financial support for the teacher to fulfill curriculum responsibilities	5.40	.84	88%
Financial support for the teacher to fulfill program evaluation tasks	5.33	.89	88%
Access to industry-relevant, modern teaching materials	5.33	.76	88%
Access to instructional technology	5.25	.98	85%
Financial support for the teacher to fulfill facility responsibilities	5.23	.92	78%
Healthy budget to support a hands-on program	5.18	.81	80%

Table 6

Consensus-achieving stakeholder and community characteristics (n = 10)

Characteristic	μ	σ	Agreement
Support of administration	5.83	.45	98%
Support of parents	5.68	.62	98%
Support of community members	5.58	.68	90%
Active agricultural education students	5.53	.60	95%
Support of school counselors	5.53	.64	93%
Support of school staff	5.38	.67	90%
Support of local businesses	5.30	.91	83%
Support of an industry-based advisory council	5.25	.98	83%
Reciprocal relationships with school community	5.23	.86	83%
Collaboration with AFNR industry stakeholders	5.15	.77	78%

Table 7

Consensus-achieving program organization and evaluation characteristics (n = 9)

Characteristic	μ	σ	Agreement
Development is based on goals, mission, or vision	5.30	.79	80%
Program is driven by continuous improvement	5.30	.76	88%
Program is held accountable at the local level	5.30	.72	85%
Program has goals and direction for continuous growth	5.28	.91	80%
Ongoing assessment or feedback drives decision-making	5.28	.78	85%
Utilizes clear processes and procedures	5.25	.81	88%
Annual review of program goals, mission, or needs	5.25	.90	80%
External partners provide feedback	5.08	.94	88%
Internal partners provide feedback	5.08	.76	85%

Table 8

Consensus-achieving marketing characteristics (n = 3)

Characteristic	μ	σ	Agreement
Internal communication efforts	5.37	.67	90%
Communication to stakeholders	5.30	.72	85%
A plan to market to students and stakeholders	5.13	.85	75%

Table 9*Consensus-achieving general program characteristics (n = 10)*

Characteristic	μ	σ	Agreement
Reasonable expectations placed on teacher	5.73	.55	95%
Emphasizes safety	5.63	.70	93%
Focuses on relationships	5.50	.68	90%
Effective retention strategies	5.40	.63	93%
Emphasizes student access to opportunities	5.40	.81	85%
Student-driven	5.28	.78	85%
Effective recruitment strategies	5.25	.71	90%
Teacher-facilitated	5.20	.88	80%
Program demographics reflect entire student body	5.08	.89	80%
Rigorous	5.03	.86	75%

Conclusions and Recommendations

The findings of this Delphi study support existing literature which suggests that the activities of SBAE programs extend beyond the traditional three-component model (Croom, 2008; Smith & Smalley, 2018). As supported by the conceptual framework, SBAE programs ought to be community-oriented (Roberts & Ball, 2009); they should be aligned with local workforce needs ($\mu = 5.35$; $\sigma = 0.80$) and bolster a community-driven curriculum ($\mu = 5.08$; $\sigma = 0.86$) which leverages the expertise of community members ($\mu = 5.58$; $\sigma = 0.68$) who can assist in garnering resources to fulfill the need for active engagement among students ($\mu = 5.53$; $\sigma = 0.60$). However, this is easier said than done; additional support is needed to help SBAE programs achieve these outcomes. In a time when teacher burnout is increasing, especially among mid-career teachers who are balancing all of the demands faced in the profession (Smith & Smalley, 2018), there is a need for additional resources and professional development to assist in-service educators in their program management responsibilities (Touchstone, 2015).

Our proposed research and professional practice recommendations can be implemented to further advance this work. One limitation of this study is that we only explored the opinions of experts who are outside of the classroom, rather than teachers who are currently in the classroom. To address this, a quantitative instrument assessing educators' implementation of the characteristics of an effective SBAE program would be a first step to determining if the expert-solicited characteristics are being implemented. A Borich (1980) model would determine discrepancy values and identify areas of professional development to assist educators in their program planning efforts. Further, a qualitative approach involving SBAE teachers, stakeholders, or students which explores their perceptions of the program may reveal additional insights related to program design. Professional practice recommendations center on developing practical training for SBAE teachers. It is recommended that state or national SBAE leaders work with teacher preparation faculty to develop program planning training so SBAE teachers can design programs which meet the desired characteristics identified within this study. A review of recent training offered by organizations such as NAAE revealed little to no focus on program planning. Training efforts should equip educators with skills in developing plans which address as many of the desired characteristics as possible, including developing a mission statement and vision statement which inspires action, the establishment of goals, and an overview of practical methods for assessing progress to meet community needs (Roberts & Ball, 2009).

References

- Barrios, M., Guilera, G., Nuño, L., & Gómez-Benito, J. (2021). Consensus in the Delphi method: What makes a decision change? *Technological Forecasting & Social Change*, *163*, 1–10. <https://doi.org/10.1016/j.techfore.2020.120484>
- Borich, G. D. (1980). A needs assessment model for conducting follow-up studies. *Journal of Teacher Education*, *31*(3), 39–42.
- Buriak, P., & Shinn, G. C. (1989). Mission, initiatives, and obstacles to research in agricultural education: A national Delphi using external decision makers. *Journal of Agricultural Education*, *30*(4), 14–23. <https://doi.org/10.5032/jae.1989.04014>
- Creswell, J. D., & Creswell, J. W. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.
- Croom, D. B. (2008). The development of the integrated three-component model of agricultural education. *Journal of Agricultural Education*, *49*(1), 110–120. <https://doi.org/10.5032/jae.2008.01110>
- Croom, D. B. (2009, March). The urgency of need. *The Agricultural Education Magazine*, *81*(5), 4. https://www.naae.org/naae/document-server/?cfd=/naae/assets/file/public/magazine/volume81/2009_03-04.pdf
- Dalkey, N. C., Rourke, D. L., Lewis, R., & Snyder, D. (1972). *Studies in the quality of life*. Lexington Books.
- Diamond, I. R., Grant, R. C., Feldman, B. M., Pencharz, P. B., Ling, S. C., Moore, A. M., & Wales, P. W. (2014). Defining consensus: A systematic review recommends methodologic criteria for reporting of Delphi studies. *Journal of Clinical Epidemiology*, *67*(4), 401–409. <https://doi.org/10.1016/j.jclinepi.2013.12.002>
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The tailored design method* (3rd ed.). John Wiley & Sons, Inc.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). *Internet, phone, mail, and mixed mode surveys: The tailored design method* (4th ed.). John Wiley & Sons, Inc.
- Foth, T., Efstathiou, N., Vanderspank-Wright, B., Ufholz, L.-A., Dütthorn, N., Zimansky, M., & Humphrey-Murto, S. (2016). The use of Delphi and nominal group technique in nursing education: A review. *International Journal of Nursing Studies*, *60*, 112–120. <https://doi.org/10.1016/j.ijnurstu.2016.04.015>
- Helmer, O. (1966). *The use of the Delphi technique in problems of educational innovations*. The RAND Corporation.

- Krieg, R. & Krieg J. (2021, November). Perseverance through partnerships. *The Agricultural Education Magazine*, 94(3), 12–14.
<https://www.naae.org/naae/document-server/?cfp=/naae/assets/file/public/magazine/volume94/2021%2011%20--%20november%20december.pdf>
- Martin, A. G., & Frick, M. J. (1998). The Delphi technique: An informal history of its use in agricultural education research since 1984. *Journal of Agricultural Education*, 39(1), 73–79. <https://doi.org/10.5032/jae.1998.01073>
- Masser, D. T., Falk, J. M., & Foster, D. D. (2014). Level of agricultural education advisory council implementation in Idaho secondary agricultural education programs. *Journal of Agricultural Education*, 55(3), 116–131. <https://doi.org/10.5032/jae.2014.03116>
- Myers, B. E., Dyer, J. E., & Washburn, S. G. (2005). Problems facing beginning agriculture teachers. *Journal of Agricultural Education*, 46(2), 47–55.
<https://doi.org/10.5032/jae.2005.03047>
- Phipps, O., Dyer, B., Lloyd, E. & James, A. (2008). *Handbook on agricultural education in public schools* (6th ed.). Delmar Learning.
- Roberts, T. G., & Ball, A. L. (2009). Secondary agricultural science as content and context for teaching. *Journal of Agricultural Education*, 50(1), 81–91.
<https://doi.org/10.5032/jae.2009.01081>
- Sackman, H. (1975). *Delphi critique. Expert opinion, forecasting, and group process*. Lexington Books.
- Shoulders, C. W., & Toland, H. (2017). Millennial and non-millennial agriculture teachers' current and ideal emphasis on the three components of the agricultural education program. *Journal of Agricultural Education*, 58(1), 85–101. <https://doi.org/10.5032/jae.2017.01085>
- Skulmoski, G. J., Hartman., F. T., & Krahn, J. (2007). The Delphi method for graduate research. *Journal of Information Technology Education*, 6(1), 1–21.
<https://www.learntechlib.org/p/111405/>
- Smith, A. R., & Smalley, S. (2018). Job stress, burnout, and professional development needs of mid-career agricultural education teachers. *Journal of Agricultural Education*, 59(2), 305–320. <https://doi.org/10.5032/jae.2018.02305>
- Sorensen, T. J., Tarpley, R. S., & Warnick, B. K. (2010). Inservice needs of Utah agriculture teachers. *Journal of Agricultural Education*, 51(3), 1–11.
<https://doi.org/10.5032/jae.2010.03001>
- Taylor, S., Stripling, C. T., Stephens, C. A., Hart, W. E., Falk, J. M., & Foster, D. D. (2017). Advisory councils in Tennessee school-based agricultural education programs. *Journal of Agricultural Education*, 58(2), 232–251. <https://doi.org/10.5032/jae.2017.02232>

SCHOOL-BASED AGRICULTURAL EDUCATION

The National Council for Agricultural Education (2023a). *About us*.
<https://thecouncil.ffa.org/ageducation/>

The National Council for Agricultural Education (2023b). *AFNR standards*.
<https://thecouncil.ffa.org/afnr/>

The National Council for Agricultural Education (2023c). *National quality program standards*.
<https://live-the-council.pantheonsite.io/program-standards-tool/>

Touchstone, A. J. L. (2015). Professional development needs of beginning agricultural education teachers in Idaho. *Journal of Agricultural Education*, 56(2), 170–187.
<https://doi.org/10.5032/jae.2015.02170>