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Evaluating Supervised Agricultural Experience (SAE) Programmes in Colleges of Education in South-East Nigeria

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Abstract: *This study aims to fill the theoretical and empirical gap by evaluating the availability, implementation, and barriers of SAE programs in Colleges of Education in South-East Nigeria. The findings provide valuable insights for agricultural educators, policymakers, and administrators to enhance the effectiveness of SAE programs and improve agricultural education in the region. Researchers adopted a descriptive survey research design which employed the use of a content-validated 39-item checklist and rating scale for observations, and also a field-tested structured questionnaire to elicit data from respondents. The questionnaire was confirmed to be reliable at reliability coefficients of 0.89 and .92 respectively for two clusters of the instrument, using the Cronbach's Alpha Coefficient Reliability method. Additionally, a cluster sampling technique was adopted by this study to select 70 lecturers and 350 students of Agricultural Education. Analysis of data collected was performed anonymously using descriptive statistics such as frequency, percentages and mean, while the variability of responses was determined using standard deviations. The observations made by researchers regarding the implementation of Supervised Agricultural Experiences (SAEs) in Colleges of Education in South-East Nigeria revealed a lack of emphasis on entrepreneurship, placement, improvement and agricultural service learning. Also, though, activities of research SAE were highly implemented, there was a lack of experiments in agricultural technology. Results show that lecturers employed methods such as practical demonstrations, group projects, field trips, excursions, lectures, and laboratory work were commonly used. However, integrating technology and guest speakers from the agricultural industry was not widely employed, indicating potential areas for improvement in instructional methods. Findings reveal barriers to the implementation of SAE to include, funding issues, poor access to facilities and equipment, lecturer incompetency, and poor college-industry linkages. Therefore, among others, this study recommends that agricultural educators and administrators should collaborate with other stakeholders to effectively implement SAEs in Colleges of Education.*

Keywords: Supervised Agricultural Experience (SAE), Entrepreneurship SAE, Exploratory SAE, Placement/Internship SAE, and Research/Experiment SAE, Agricultural Service Learning SAE, Improvement SAE, Directed College Laboratory SAE.

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Background of the Study

Supervised Agricultural Experience (SAE) programmes are crucial in Agricultural Education programmes implemented in Nigerian institutions (Asogwa, Ona and Gideon, 2022), including Colleges of Education, where prospective Agricultural Science teachers are being prepared to educate and inspire the next generation of farmers and agribusiness professionals (National Commission for Colleges, 2009). The successful implementation of Agricultural programmes in Colleges of Education requires a combination of theoretical and practical experiences. These experiences are guided by the three foundational philosophical components, namely Classroom/Laboratory Instruction, FFA Leadership Organization and SAE (Rubenstein et al., 2014). Among others, the focus of this study is to x-ray the SAEs implemented in Colleges of Education in Nigeria, particularly in the Southeast [SE].

Supervised Agricultural Experience (SAE) programmes are carefully organized and supervised initiatives consisting of experiential learning activities that go beyond traditional classroom instruction (Barrick *et al.,* 2011). Similarly, NAEC (2015) posited that SAE programmes are designed to offer hands-on opportunities for students of Agricultural Education to apply both academic and occupational proficiencies within a simulated environment or an actual workplace. Based on the views of Barrick *et al.* (2011) and NAEC (2015), this study deduces that comprehensively, SAE programmes can be conceptualized as properly planned programmes implemented by agricultural educators in collaboration with technologists within (simulated environment) or outside the school environment, which provide hands-on activities (experiential learning) for students of agriculture, to complement, experience, reflect, reason and experiment classroom theories, and also agricultural applications obtainable in the world of work. Additionally, Rank and Retallick (2017) stated that SAE is one of the three-component models of SBAE which delineates the philosophical principles underlying agricultural education programs during the early 20th century and serves as a guiding force shaping the identity and evolution of agricultural education. Arguably, this view by Rank and Retallick (2017) is admitted by other literature (Famiwole, 2015; Rubenstein *et al.,* 2014, Asogwa, Ona and Gideon, 2022; Barrick *et al.,* 2011), and also some authorities in Agricultural Education (NAEC, 2015; National FFA Organization, 2021).

The SAE programme aims to enrich students' understanding, skills, and awareness of the agricultural industry (Barrick *et al.,* 2011). Similarly, in the views of Cheek, Arrington, Carter and Randell as cited in Rubenstein and Thoron (2015), SAE programs equip students with the capacity to apply academic principles and cultivate career-oriented abilities in agriculture. In the views of the National Council for Agricultural Education (2015), by participating in the SAE program, students gain the ability to explore various career paths and occupations, acquire knowledge of appropriate workplace conduct and cultivate industry-specific skills, and develop the practical application of their classroom learning, effectively preparing them for the transition into college and diverse career opportunities. Worthy of note, a literature review conducted by Famiwole (2015) views SAE as a "panacea for empowering youths and preventing Joblessness". The author revealed through his review that SAE helps to "link classroom Instructions with skill development activities, and prevent joblessness through Skill development programmes in Agriculture". Olaitan (2010) argued that attitudes, knowledge, skills, and understanding of agriculture are most effectively taught and learned through hands-on experiences. Thus, providing hands-on activities

for students of Agricultural Education in Colleges of Education is accomplished by agricultural educators through the implementation of Supervised Agricultural Experience (SAE) programmes, as one of the three components of School-Based Agricultural Education (SBAE). Similarly, Phipps *et al.* as cited in Famiwole and Kolawole (2013), argue that the Supervised Agricultural Experience (SAE) programmes are powerful tools that agricultural educators can utilize to connect the school environment with agricultural occupations, enterprise education, skill development, and employment opportunities. Thus, this study recommends that the contents or types or activities of SAE programs implemented by agricultural educators in Nigerian Colleges of Education should be carefully selected and implemented to meet the objectives enumerated above.

Shreds of evidence in literature reveal varying contents or types or activities of SAE programmes that could be implemented in School-Based Agricultural Education (SBAE) (National Council for Agricultural Education (NCAE, 2012, 2015, 2023) which are in line with the curriculum prescription by the National Commission for Colleges of Education (NCCE, 2012), which is a body in charge of curriculum development for all Colleges of Education in Nigeria. According to the NCCE, Colleges of Education that offer agricultural education programs should have two properly equipped laboratories specifically designed for conducting experiments related to crops, soil, and livestock. In addition to the laboratories, a standard school farm complex should include various components such as a mechanical/tools workshop, a livestock unit consisting of carefully selected farm animals, a fish pond, individual student plots, an experimental plot for conducting research, a crop farm, and facilities for beekeeping, snail farming, or cane rat farming. The school farm itself should consist of an arable farm covering at least one hectare of land, where tubers, cereals, legumes, and fibres are cultivated (NCCE, 2012). It should also have a horticultural garden containing a nursery and a variety of ornamental plants, fruits, root crops, and leafy vegetables. Furthermore, the school farm should have an orchard with different types of fruit trees, as well as a plantation for permanent crops. Students must gain practical experience with farm machinery and learn about the processing and storage of crops and animals, as well as nursery practices (NCCE, 2012 International Professional Centre-IPCentre, 2021). Comparatively, deducing from the recommendations of the National Council for Agricultural Education (NCAE, 2012, 2015, 2023), SBAE in Nigerian Colleges of Education must offer a wide range of SAE options for students to select, including but not limited to *"foundational SAEs"* focusing on career exploration and planning, personal financial planning and management, workplace safety, employability skills for college and career readiness and agricultural literacy, and also *"immersion SAEs"* emphasizing entrepreneurship and ownership, involving school business enterprises, providing placement opportunities and internships, focused on research (including experimental, analytical, and invention-based) and incorporating service learning. Comprehensively, based on evidences presented in variety of sources, researchers argue that SAE programmes could be categorized into 7 broad components such as Ownership or Entrepreneurship SAE (O/ESAE), where students start and manage their own agricultural business and other entrepreneurial activities (Lang *et al*., 2022; Ademu *et al.,* 2023; Heinert & Roberts, 2018; IPCentre, 2021; CAERT, n.d; NCAE, 2017); Placement/Internship SAE (P/TSAE) through which **s**tudents gain work experience by working on/with farms, ranches, nurseries, agricultural research institutes, agribusiness and agricultural practices (NCAE, 2017, IPCentre, 2021; "SAE FOR ALL", 2019; CAERT, n.d); Experimental or Research SAE (E/RSAE), in which **s**tudents conduct research in areas such as crop production, animal science, soil science and agricultural technology (NCAE, 2017, IPCentre, 2021; Georgia

FFA, nd; CAERT, n.d); Exploratory SAE (ESAE) where students explore different areas of agriculture by visiting agricultural enterprises, attending agricultural workshops, among others (IPCentre, 2021; CAERT, n.d); Improvement SAE (ISAE), which assists students implement innovative techniques in sustainable agriculture and adopt new technologies (Georgia FFA, nd; Missouri Department of Elementary and Secondary Education, 2013); Directed College Laboratory SAE (DCLSAE), through which **s**tudents involve in agricultural activities on crop production, livestock management, hydroponics and aquaculture/fishery within College laboratories (Georgia FFA, nd); and Agricultural Service Learning SAE (ASLSAE) through which **s**tudents engage in community development through agricultural-related service projects like organizing promotion or awareness campaigns, developing community gardens and rendering voluntary services at agricultural events (NCAE, 2017).

Theoretically, the components (types/activities) and objectives of the SAE programme implemented by agricultural educators in Colleges of Education, are deeply rooted in the principles of Kolbe's experiential learning theory (Kolb, 1984), as well the theorems of vocational education by Posser and Quigley (1949). For instance, based on the postulates of Kolbe, learning occurs through a cyclical process of experiencing ("concrete experience"), reflecting ("reflective observation"), reasoning ("abstract conceptualization"), and applying information ("active experimentation") (Niemi, 2023; Kolb, 1984). Deductively, the authors of this paper argue that ideal SAE programmes must provide a training environment for students to adequately experience, reflect, reason and apply desirable and innovative information in agriculture. Similarly, the NCAE (2015) affirmed that the inclusion of experiential and work-based learning within agricultural education at school enables local programs to expand their reach beyond the confines of the classroom and engage with the community, thereby fostering the development of industry-specific and career-oriented skills in individual students. Thus, the approach employed to deliver this impactful experiential learning is known as the Supervised Agricultural Experience (SAE) (NCAE, 2015). Furthermore, the SAE programmes provided for students of Agricultural Education in Colleges of Education must be a replica of the real work environment or agricultural industry. This argument is based on the theorem of Posser and Quigley on vocational education, which postulates that the effectiveness of vocational education (in the context of agricultural education) relies on the extent to which the training environment accurately reflects the work environment where the learner will eventually be employed (Posser & Quigley, 1949). Thus, SAE programmes implemented in Nigerian Colleges of Education should be adequately developed and implemented by agricultural educators in collaboration with other stakeholders to actively engage students in hands-on or manipulative activities which are in line with classroom theories as well as real-world application of agricultural experiences. However, the study by Barrick and Estepp (2011) found that educators have over the years expressed multiple concerns about their capacity to and barriers to create and execute SAE programs in SBAE offered in institutions.

Different studies have indicated some barriers to the implementation of SAE programmes, and also SBAEs in both Nigeria and other countries (Retallick, 2010; Famiwole & Kolawole, 2013; Asogwa, Ona and Gideon, 2022; Amuriyaga *et al.,* 2018; Onu, Ugwuoke and Asogwa, 2020; Ekele, Doom and Ngbongha, 2020; NAEC, 2015; Rubenstein and Thoron, 2015), however, none of these studies investigated issues inherent in SAE programmes Nigerian Colleges of Education. Based on the findings of quantitative research conducted by Asogwa, Ona and Gideon (2022) on

the availability and implementation of the three-component model of agriculture, SAE programs currently being carried out in Nigerian public schools face various difficulties that ultimately hinder the proper execution of their elements (SAE, Classroom/Laboratory Instruction and FFA Leadership Organization). Specifically, it was discovered by Asogwa, Ona and Gideon (2022) that the implementation of Supervised Agricultural Experiences (SAEs) in schools is hindered by the absence of SAE program plans, insufficient infrastructure, limited funding, and inadequate student involvement in SAEs. These findings align with Moore's (2017) observations that SAEs suffered from inadequate funding to the extent that students had to rely on their funds or seek financial assistance from community members. Moore (2017) also noted that teachers faced challenges in managing time for SAE activities and lacked adequate preparation. These issues contribute to inadequate planning for SAE programs. Additionally, Amuriyaga *et al.* (2018) identified several challenges to conducting agricultural practical activities which are major elements of SAEs, including poorly equipped school farms, insufficient tools and equipment, large class sizes and grouping issues, insufficient time allocated for practical work, a shortage of skilled farm labourers, time constraints, and high material costs. Similarly, NAEC (2015) has equally observed that a lack of resources to help students create ideas affects SAE programs. In line with these findings, two recent studies in Nigeria by Onu, Ugwuoke and Asogwa (2020) and Ekele, Doom and Ngbongha (2020) evaluated Agricultural Education programmes through survey, these studies generally found that there are limited resources to implement agricultural programmes in Colleges of Education in South-East Nigeria, which limits the effectiveness of the programme, though the findings of these studies were broad, and not focused on evaluating particularly the SAE programmes as an integral philosophical component of Agricultural of Education in Colleges of Education. This suggests the need to conduct an in-depth study, to adequately evaluate the availability of SAEs in Colleges of Education, and also its implementation. In agreement with the findings of Amuriyaga *et al.* (2018), Onu, Ugwuoke and Asogwa (2020) and Ekele, Doom and Ngbongha (2020), another study by Retallick (2010), though conducted in the US, identified five limitations to SAE in schools which include, the mechanics and structure of schools, availability of resources, the perception or image of SAE, shifting demographics and societal attitudes, and the agricultural education system itself. These findings, according to Retallick (2010), suggest a disconnection between the theoretical understanding and practical application of SAE, and the experiences and learning outcomes associated with SAE.

Additionally, empirical evidence shown in a qualitative study conducted by Rubenstein and Thoron (2015) reveals that participation in Supervised Agricultural Experience (SAE) programs, which were initially developed as an essential part of Supervised Agricultural Education (SBAE), has experienced a consistent decrease in schools, and could have a significant effect on the teaching and learning of agriculture. This observation is also in line with that of the researchers in Nigerian Colleges of Education based on experiences and observations, where it was observed that teaching and learning of Agriculture have been largely reduced to “talk and chalk” approaches, with little or no practical orientations. Similarly, Famiwole and Kolawole (2013) discovered in their study that the vocational aspect (in context SAE) has been lacking in the teaching and learning of agriculture, and the programme needs to be evaluated. Additional research by Retallick (2010) indicated that educators often discuss Supervised Agricultural Experience (SAE) programs in a Retallick (2010) found that the methods employed by agricultural educators to execute SAE

programs varied significantly, as did the approaches they used to conduct these programs. These findings by Retallick (2010) partly motivated the researchers to evaluate the methods used in delivering SAE programmes in Nigerian Colleges of Education. Based on the recommendations and standards of the National Commission for Colleges of Education (NCCE), the mode of teaching of Agricultural Education courses, including SAEs should be by lectures, tutorials, field trips, excursions, practicum, laboratory work, information and communication technology and practical as deemed appropriate for each course (NCCE, 2012). However, there seems to be little or no empirical evidence revealing the methods used by lecturers of Agricultural Education in SE, if they are in line with the recommendations of NCCE.

Based on the assertion of Rubenstein and Thoron (2015), some literature has extensively discussed various issues related to the implementation of SAE programmes, though it was observed that most were not recent. Despite this, some of the recent studies on this subject view were conducted in the US, and in high schools (Rubenstein and Thoron, 2015; Retallick, 2010), while those conducted in Nigeria were not focused on evaluating SAEs in Colleges of Education, but secondary schools (Asogwa, Ona & Gideon, 2022; Famiwole & Kolawole, 2013). Based on these issues, this study argues that there seems to be a theoretical gap in this subject-view based on school type in Nigeria. Worthy of note, the context of the institution for this study is Colleges of Education, particularly in South-East Nigeria. Furthermore, based on the extensive electronic literature search conducted by researchers using suitable search terms on databases such as Google Scholar, ProQuest and Web of Science, there seems to be a paucity of empirical evidence on the availability and implementation of SAEs in Nigerian Colleges of Education, particularly in South-East Nigeria. In other words, there is currently a lack of research evaluating the availability and implementation of SAE programmes in Colleges of Education in South-East Nigeria. Thus, the researchers agree with Rubenstein and Thoron (2015) and Retallick (2010) who independently recommended in the US that there should be a more in-depth investigation into the implementation of SAE programs in School-Based Agricultural Education (SBAE), hence the need for this study in Nigeria among other evidence-based backdrops highlighted above.

The purpose of this study is to evaluate SAE programmes in the Colleges of Education in South-East Nigeria with specific reference to types available, implementation and barriers, and also to provide empirical evidences which could assist concerned stakeholders such as agricultural educators, government and administrators of NCE to formulate and drive certain policy actions to improve the implementation of SAE in order to accomplish its objectives. By implication, some researchers opined that inadequate implementation of SAE programs in schools could have an impact on both food security and the global reach of SBAE in Nigerian institutions (Asogwa, Ona and Gideon, 2022), thus there is need to empirically establish its current status on types, implementation and barriers. Therefore, the results of this study can help inform future attempts to increase the effectiveness of SAE programs by highlighting their strengths and flaws for policymakers, educators, and other stakeholders in agricultural education. The findings of this evaluation will contribute to the advancement of agricultural education and the preparation of future agricultural educators in South-East Nigeria.

Specific Objectives and Research Questions

To accomplish the purpose of this study, the following specific objectives guided the study, with corresponding research questions.

Table 1: Mapping of Research Objectives and Questions

S/N	Specific Objectives	Research Questions
1	To investigate the types/activities of SAE programmes available in Colleges of Education in South-East Nigeria	What are the types/activities of SAE programmes available in Colleges of Education in South-East Nigeria?
2	To examine the extent to which SAE programmes are implemented in Colleges of Education in South-East Nigeria	To what extent are SAE programmes implemented in Colleges of Education in South-East Nigeria?
3	To find out the methods used by agricultural educators in delivering SAE programmes in Colleges of Education in South-East Nigeria	What methods are used by agricultural educators in delivering SAE programmes in Colleges of Education in South-East Nigeria?
4	To determine the perceived barriers to implementing SAE programmes in Colleges of Education in South-East Nigeria from the perspectives of both students and educators.	What are the perceived barriers to implementing SAE programmes in Colleges of Education in South-East Nigeria?

Methodology

To accomplish the specific objectives of this study, the investigators adopted a descriptive survey research design. This research design was adopted by researchers to gather data, analyze and describe the traits, actions, viewpoints, or attitudes of a certain population or group (McCombes, 2022; Nwogu as cited in Onu, Ugwuoke and Asogwa, 2020). The geographical delimitation of this study is South-East Nigeria, thus the target population for this investigation comprised all lecturers and students of Agricultural Education in the seven (7) public Colleges of Education within this area. The choice of this population is that lecturers and students of Agricultural Education are stakeholders in the implementation of SAE programmes in Colleges of Education, thus their perceptions of this subject-view would elicit reliable information. South-East is one of the geopolitical zones in Nigeria, comprising of 5 politically independent states, including Abia, Anambra, Enugu, Ebonyi and Imo State. In this zone, there are two Federal and 5 State Colleges of Education. As at the time of this study, the sampling frame of the entire target population was not available, and could not be easily accessed and established by researchers. Therefore, a cluster sampling method was adopted by the researchers. Thoma (2023) asserted that cluster sampling is a practical sampling technique used when the population is unknown or difficult to define, providing a means to obtain representative data and draw accurate conclusions about the larger population. Consequently, 10 lecturers and 50 students of Agricultural Education were randomly selected from each of the clusters (seven public Colleges of Education) domiciled in 5 states in South-East Nigeria, resulting to a cluster sample size of 420 respondents for the study [70 lecturers and 350 students of Agricultural Education]. Also 5 out of the 7 Colleges of Education in Southeast were randomly selected for observations.

Researchers used a content-validated and field-tested structured questionnaire for collecting quantitative data for research question 3 and 4, while data for research question 1 and 2 were respectively generated through observations using a content-validated checklist and rating scale

(scored dichotomously by researchers: 1= presence and 0 = absence, and then rated on High Extent [4][70-100%], Moderate Extent [3] [40-69%], Low Extent [2] [10-39%], Not Implemented [1][0%-9%]*).* The instruments were validated by two experts in Agricultural Education and one in Measurement and Evaluation, all in Michael Okpara University of Agriculture. Items for the instruments were adapted from literatures reviewed on the subject of this research (Retallick, 2010; Famiwole & Kolawole, 2013; Asogwa, Ona and Gideon, 2022; Amuriyaga *et al.*, 2018; Onu, Ugwuoke and Asogwa, 2020; Ekele, Doom and Ngbongha, 2020; NAEC, 2015; Rubenstein and Thoron, 2015), and structured on a 4 Likert scale for research question 3 and 4 [Strongly Agreed = 4, Agreed = 3, Disagree = 2 and Strongly Disagree =1]. The Cronbach's Alpha reliability test performed on data gathered from 20 respondents in Colleges of Education, during a pilot study in Rivers State (part of South-South Nigeria), indicated 0.89 and .92 respectively for the questionnaire-clusters capturing research question 3 and 4. On average, the reliability of the instrument was .87, which indicates higher reliability. This decision by researchers is based on general guidelines proposed by Nag and Ahmad Malik (2023), which suggest that Cronbach's alpha coefficient values below 0.7 indicate a poor or weak instrument, rendering them unacceptable, values above 0.70 are generally considered acceptable for research purposes, while values of 0.80 or higher indicate good reliability. Moreover, values above 0.90 are indicative of excellent reliability.

Data collection for this investigation was done by the researchers within the period of 4 months, using a checklist, rating scale and questionnaire. Specifically, observations were made on SAEs in selected Colleges of Education in the Southeast and independently rated by the researchers. Data was also elicited from respondents using a structured questionnaire. Furthermore, data collected for the study through the questionnaire were cleaned, and organized, using a computer application software known as EXCEL, before it was imported into SPSS for anonymous analysis, while observations made on SAEs were scored and independently rated by researchers. The researchers analyzed the data gathered for research questions 3 and 4 using descriptive statistics like weighted mean and standard deviations. For the 4-point Likert Scale, any item scoring mean values below 2.50 was described as "majority disagreed", while items scoring 2.50 was described as "equal degrees/levels of agreement and disagreement among respondents", while above 2.50 was described as "majority agreed". Regarding data recorded through the checklist and rating scale, the total scores for each of the activities under an SAE programme were computed for each College of Education (CED) accessed (anonymously coded as CED1, CED2, CED3; CED4 and CED5). Total scores and independent ratings by researchers were used to describe the type /activities of SAE programmes available in each of the CEDs. More so, the overall score activities of each SAE type observed in the 5 Colleges of Education were computed into percentages [] to describe the extent of implementation (High Extent: 70-100%, Moderate Extent: 40-69%, Low Extent: 10-39%, Not Implemented: 0%-9%*).*

Ethical Considerations for the Study

To conduct this research, the researchers obtained ethical permission from Michael Okpara University of Agriculture Umudike (MOUA). In addition, before using the rating scale for observations, researchers sought the consent of five (5) Colleges of Education in South-East. This was done through a consent letter which clearly explained the research objectives and benefits, and also details of the confidentiality of participants. Furthermore, the questionnaire was voluntarily administered to participants. Data collected from respondents were anonymously analyzed, that is, researchers ensured anonymity and confidentiality of the participants or data

sources involved. Also, the researchers ensured that authors and organizations whose intellectual properties were used in this study were cited in an honest manner.

Results and Analysis

The results of the study in line with research questions (RQ) are presented below using tables, while descriptive analysis of the results was performed.

Table 2: Independent Observations of Researchers on Types/Activities of SAE Programmes Available in Colleges of Education in South-East Nigeria [RQ_1]

	Items	**Scoring/Observations**					
		CED_1	**CED_2**	**CED_3**	**CED_4**	**CED_5**	**Total Item Scoring(5)**
	Entrepreneurship SAE Students start and manage their own agricultural business and other entrepreneurial activities						
1	Students manage small-scale farm	0	0	0	1	0	**1**
2	Students manage greenhouse	0	0	0	0	0	**0**
3	Students manage agricultural service enterprise.	1	0	0	0	0	**1**
4	Students learn about business planning	0	0	0	0	0	**0**
5	Students learn about marketing	1	1	1	1	1	**5**
6	Students learn about financial management	0	0	0	0	0	**0**
7	Students learn customer relations	0	0	0	0	0	**0**
	Total scoring for each CED [7]	**2**	**1**	**1**	**1**	**1**	
	Placement SAE- Students gain work experience by working on/with:						
8	Farms	1	1	1	1	1	**5**
9	Ranches	0	0	0	0	0	**0**
10	Nurseries	1	0	0	1	0	**2**
11	Agricultural research institutes	0	0	0	0	0	**0**
12	Agribusinesses	0	0	0	0	0	**0**
13	Agricultural professionals	1	1	1	1	1	**5**
14	Students learn about various agricultural practices, techniques, and industry-specific skills.	1	1	1	1	1	**5**
	Total scoring for each CED [7]	**4**	**3**	**3**	**4**	**3**	
	Research SAE:-Students conduct research in areas such as:						
15	Crop production	1	1	1	1	1	5
16	Animal science	1	1	1	1	1	5
17	Soil science	1	1	1	1	1	5
18	Agricultural technology/farm machinery	0	1	0	0	1	2
19	Agricultural economics	1	1	1	1	1	5
20	Students are taught research methodologies, data collection, analysis, and presentation skills.	1	1	1	1	1	5
	Total scoring for each CED [6]	**5**	**6**	**5**	**5**	**6**	
	Exploratory SAE:-Students explore different areas of agriculture by:						
21	Visiting agricultural enterprises	1	1	1	1	1	5
22	Attending agricultural workshops	0	1	0	1	1	3
23	Participating in agricultural competitions	0	0	0	0	0	0
24	Attending seminars	0	1	0	1	1	3
	Total scoring for each CED [4]	**1**	**3**	**1**	**3**	**3**	

Dichotomous Scoring: Absence [0]; Present [1], CED =College of Education

Table 2 [Cont.]: Independent Observations of Researchers on Types/Activities of SAE Programmes Available in Colleges of Education in South-East Nigeria [RQ_1]

		Scoring/Observations					
		CED_1	**CED_2**	**CED_3**	**CED_4**	**CED_5**	**Total Item Scoring(5)**
	Improvement SAE:- Students implement innovative techniques in sustainable agriculture like:						
26	Organic farming	1	0	1	0	1	3
27	Soil conservation practices like terracing, mulching,	1	1	0	1	0	3
28	Integrated pest management,	0	0	0	0	0	0
29	Water management	1	0	0	0	0	1
30	Precision farming	0	0	0	0	0	0
31	Agroforestry or Taungya farming	0	0	0	0	0	0
32	Adopting new technologies like hydroponics, aquaponics, etc.	0	0	0	0	0	0
	Total scoring for each CED [7]	**2**	**1**	**1**	**1**	**1**	
	Directed College Laboratory SAE:- Students involve in agricultural activities within College laboratories						
33	Laboratory activities on crop production	1	1	1	1	1	5
34	Laboratory activities on livestock management	1	0	1	0	1	3
35	Laboratory activities on hydroponics	0	0	0	0	0	0
36	Laboratory activities on aquaculture/fishery	1	0	1	1	0	3
	Total scoring for each CED [4]	**3**	**1**	**2**	**2**	**2**	
	Agricultural Service Learning SAE:-Students engage in community development through agricultural-related service projects like						
37	Organizing promotion or awareness campaigns	0	0	0	0	0	
38	Developing community gardens	0	0	0	0	0	
39	Rendering voluntary services at agricultural events	0	0	0	0	0	
	Total scoring for each CED [3]	**0**	**0**	**0**	**0**	**0**	

Dichotomous Scoring: Absence [0]; Present [1], CED =College of Education

Data in Table 2 above show the observations made by researchers on types/activities of SAE programmes available in colleges of education in Southeast Nigeria. Observation reveals that each of the items under entrepreneurship SAE had low scores ranging from 1-2 over 7, which implies that the majority of SAE activities under this category were absent in the Colleges of Education in Southeast Nigeria. Specifically, it was observed that students learn about agricultural marketing in the five Colleges of Education in Southeast Nigeria [Score: 5/5], also students manage small-scale farms and agricultural service enterprises in one CED1, while managing greenhouses [Score: 0/5], business planning [Score: 0/5], customer relations [Score: 0/5] and financial management [Score: 0/5], were absent across the 5 Colleges of Education observed. Under placement SAE, it was observed that each of the items had scores ranging from 3 to 4 over 7. This implies that there was a presence of placement SAE activities. Specifically, students gain experiences by working on farms [Score: 5/5], and also with agricultural professionals [Score: 5/5] and learn about various agricultural practices, techniques, and industry-specific skills [Score: 5/5]. Researchers observed that there was the absence of placement SAE activities exposing students to gain experiences in ranches [Score: 0/5], nurseries [Score: 0/5] and agricultural research institutes, agribusiness [Score: 0/5] in CED.

Regarding research SAEs, evidences are present. This is because the observation scores for each of the items range from 2 to 5 over 5, while observation scores for each of the Colleges of Education range from 5 to 6 over 6. Specifically, students conduct research in areas such as crop production [Score: 5/5], soil and animal science [Score: 5/5], and agricultural economics [Score: 5/5] and students are taught skills in research methods, data collection, analysis and interpretation [Score: 5/5]. On the contrary, there was a low score on agricultural technology [2/5].

Observations made on exploratory SAE show that some activities are present while some are absent in the Colleges of Education [CED1: ¼, CED2: ¾, CED3: ¼, CED4: ¾, CED5: ¾]. Students explored areas of agriculture by visiting agricultural enterprises [5/5], and participating in workshops [5/5], and seminars [5/5]. Additionally, observations reveal that participating in agricultural competitions was lacking in all the Colleges observed [Score: 0/5]. Some activities in improvement SAEs like Integrated pest management [Score: 0/5], precision farming [Score: 0/5], water management [Score: 0/5] and adopting hydroponics and aquaponics [Score: 0/5] were also found lacking in the five CEDs; the observation scores for each of the items range from 1 to 2 over 7. However, it was observed that organic farming [3/5] and Soil conservation practices like terracing, and mulching [3/5] had the highest scores, thus indicating their presence in Colleges of Education in Southeast Nigeria.

Additionally, observations made on directed college laboratory SAE reveal that there were agricultural activities within College laboratories on crop production [Score: 5/5], livestock management [Score: 3/5], and aquaculture and fishery [Score: 3/5], while none was present for hydroponics [Score: 0/5]. However, evidence in the five Colleges observed shows that there are activities of directed college laboratory SAE. With regards to agricultural service learning SAEs, it was observed that there were no activities on community developments like organizing promotion or awareness campaigns, developing community gardens and rendering voluntary services at agricultural events. This is because the observation scores for each of the items under this category of SAE in the CED were zero [0].

Table 3: Observers' Rating on Extent of Implementation of SAEs in Colleges of Education in Southeast Nigeria [RQ$_2$]

	Items	Total Item Scoring for each CED								Observers' Rating on Extent of Implementation of SAE			
	Observed SAE Categories	**Number of Items scored**	**CED$_1$**	**CED$_2$**	**CED$_3$**	**CED$_4$**	**CED$_5$**	**Total**	**%**	**1**	**2**	**3**	**4**
1	Entrepreneurship SAE	**7x5[35]**	**2**	**1**	**1**	**1**	**1**	**6**	**17.14**				
2	Placement SAE	**7x5[35]**	**4**	**3**	**3**	**4**	**3**	**17**	**48.57**				
3	Research SAE	**6x5[30]**	**5**	**6**	**5**	**5**	**6**	**27**	**90**				
4	Exploratory SAE	**4x5[20]**	**1**	**3**	**1**	**3**	**3**	**11**	**55**				
5	Improvement SAE	**7x5[35]**	**2**	**1**	**1**	**1**	**1**	**8**	**22.85**				
6	Directed College Laboratory SAE	**4x5[20]**	**3**	**1**	**2**	**2**	**2**	**10**	**50**				
7	Agricultural Service Learning SAE	**3x5[15]**	**0**	**0**	**0**	**0**	**0**	**0**	**0**				

5 = number of Colleges of Education, High Extent [4][70-100%], Moderate Extent [3] [40-69%], Low Extent [2] [10-39%], Not Implemented [1][0%-9%], CED= College of Education

Data in Table 3 above indicate observers' rating on the extent of implementing various activities of SAEs observed in 5 Colleges of Education in Southeast Nigeria. Specifically, it reveals that the percentage rating of the activities under entrepreneurship SAE is 17.41%, and falls within the limits of 10-39%. This implies that these activities are implemented to a low extent. Also, activities of improvement SAE [22.85%] equally fall within the percentage limits of 10-39%, which implies it is implemented to a low extent. With regards to placement, exploratory and directed laboratory SAEs, the percentage rating of the activities is respectively 48.57%, 55% and 50%, which fall within the limits of 40-69%. This implies that activities under these categories of SAE are moderately implemented. However, there was the highest rating for activities under research SAE

[90%], which indicates that it was implemented to a high extent. Also, it was observed that activities of agricultural service learning SAE were not implemented even in any of the Colleges of Education. Additionally, the researchers gathered data from randomly selected respondents to investigate the methods used in delivering these SAEs in Colleges of Education in South-East Nigeria. The results of this investigation are presented in Table 3 below.

Table 4: Methods used by agricultural educators in delivering SAE programmes in Colleges of Education in South-East Nigeria [RQ3] ***n= 420***

S/N	Item Statements	$\bar{x}$	*S*	Remarks
1	Practical demonstrations	3.15	.61	**MA**
2	Integrating technology (e.g., computer simulations and online resources)	1.14	.30	**MD**
3	Group projects (problem-solving collaborative learning activity)	3.09	.81	**MA**
4	Peer-to-peer learning (collaborative learning activity)	2.50	.56	**EAD**
5	Field trips	3.26	.53	**MA**
	Excursions	3.30	.60	**MA**
6	Lectures by guest speakers from the agricultural industry	2.15	.51	**MD**
7	Lecture Method	4.04	.70	**MA**
8	Laboratory work	3.31	.80	**MA**

*$\bar{x}$ = Sample mean, **MA** = Majority Agreed, **EAD** =Equal agreement and disagreement, **MD** = Majority Disagreed, **S** = standard deviation for the sample, **n** = number of respondents*

Data in Table 4 above reveal that the mean values of 6 out of the 8 items range from 3.09 to 4.04, and are above 2.50 on a 4-point Likert scale. Therefore, this implies that the majority of the respondents agreed that practical demonstrations [$\bar{x}$:3.15], group projects [$\bar{x}$:3.09], field trips [$\bar{x}$:3.26], excursions [$\bar{x}$:3.30], lecture method [$\bar{x}$:4.04], and laboratory work [$\bar{x}$:3.31] are methods used by agricultural educators in delivering SAE programmes in Colleges of Education in South-East Nigeria. However, 1 out of the 8 items has a mean value of 2.50 which is equal to 2.50 (mean cut-off) on a 4-point Likert scale. This indicates an equal agreement and disagreement on peer-to-peer learning (collaborative learning activity) as one of the methods used by lecturers of Agricultural Education in delivering SAEs in Colleges of Education. More so, 2 out of the 8 items have mean values ranging from 1.14 to 2.15 and are above 2.50 on a 4-point Likert scale. This implies that the majority of the respondents did not agree that integrating technology (e.g., computer simulations and online resources) [$\bar{x}$:1.14] and lectures by guest speakers from the agricultural industry [$\bar{x}$:2.15] are methods used in delivering SAEs. Researchers argue that variations in perceptions of respondents on these items may be due to the individual experiences of students and lecturers on SAE implementation in each of the Colleges of Education in South-East Nigeria. However, based on the responses of respondents, it could be deduced that the majority are in agreement that methods such as practical demonstrations, group projects, field trips, excursions, lecture methods and laboratory work are methods used by agricultural educators in delivering SAE programmes, while technology integration and lectures by guest speakers from agricultural industries are not used. The values of standard deviation for all 8 items range from 0.30 to 0.80 [Low standard deviation]. This indicates less dispersion or variability of responses, with data points clustered closer to the mean. Additionally, researchers went further by

investigating the barriers to implementing SAEs in Colleges of Education. Thus, the results are presented below.

Table 5: Perceived barriers to implementing SAE programmes in Colleges of Education in South-East Nigeria [RQ$_4$] ***n= 420***

	Item Statement	$\bar{x}$	*S*	Remarks
1	Insufficient funding	4.10	.73	**MA**
2	Limited access to agricultural facilities and equipment	3.13	.43	**MA**
3	Incompetency of some lecturers	4.15	.81	**MA**
4	Lack of enabling administrative policies	4.21	.56	**MA**
5	Inadequate training or professional development of lecturers	4.26	.52	**MA**
6	Poor college and industry linkages (collaboration and partnership)	4.14	.47	**MA**
7	Limited support and recognition of SAEs	4.04	.49	**MA**

*$\bar{x}$ = Sample mean, **MA** = Majority Agreed, **EAD** =Equal agreement and disagreement, **MD** = Majority Disagreed, **S** = standard deviation for the sample, **n** = number of respondents*

In Table 5 above, all 7 items have mean values ranging from 4.04 to 4.26 and are above 2.50 on a 4-point Likert scale. This indicates that majority of the respondents agreed that the barriers to implementing SAE programmes in the Colleges of Education in South-East Nigeria include insufficient funding [$\bar{x}$**:**4.10], limited access to agricultural facilities and equipment [$\bar{x}$**:**3.13], incompetency of some lecturers [$\bar{x}$**:**4.15], lack of enabling administrative policies [$\bar{x}$**:**4.21], inadequate professional development of lecturers [$\bar{x}$**:**4.26], poor college and industry linkages [$\bar{x}$**:**4.14] and limited support and recognition of SAEs [$\bar{x}$**:**4.04]. Additionally, all the items scored low standard deviations ranging from 0.47 to 0.81. This implies that there was less variation within the responses of respondents and that data points are closer to the mean.

Discussion Findings

Observations made by the researchers with a checklist reveal that the majority of the activities observed under Entrepreneurship SAE (ESAE) in the Colleges of Education in Southeast Nigeria were absent. These include activities managing greenhouses by students, business planning, customer relations and financial management, though it was found that students learn about agricultural marketing. Further observation reveals that some students managed small-scale farms and agricultural service enterprises in one CED. These observations are in harmony with Onipede (2013) who decried that some courses that aid students in starting their businesses were lacking in the curriculum of the colleges of education. Having analysed the content of the objectives of agricultural education in Colleges of Education, Onipede (2013) further asserted that one of its objectives is to produce employable graduates who have the competence to start and run agribusinesses. Therefore, this study argues that this objective cannot be accomplished without adequate presence and implementation of Entrepreneurship SAE programmes in Agricultural education offered in Colleges of Education. As a result, the National Commission for Colleges of Education (NCCE), following the Federal Government's educational policy, recommended that all students receive entrepreneurship training to prepare them for the wider range of opportunities to create jobs and ultimately become employers of labour (Adesoji & Sangoleye, 2017). However, based on observers' ratings Entrepreneurship SAE was implemented to a low extent [17.41%] in Colleges of Education. Furthermore, regarding Placement/Internship SAE (P/ISAE), it was observed that there was a presence of activities where students gain experiences by working on

farms, and also with agricultural professionals and learn about various agricultural practices, techniques, and industry-specific skills. This finding is in line with the recommendations of NCCE (2012) that agricultural education programs should have properly equipped school farms for students' placement, and that it should have various components such as a mechanical/tools workshop, a livestock unit consisting of carefully selected farm animals, a fish pond, a crop farm, and facilities for beekeeping, snail farming, or cane rat farming. However, this study found that there was the absence of some placement SAE activities that can expose students to gain experiences in ranches, nurseries, agricultural research institutes, and agribusiness in the Colleges of Education in Southeast Nigeria. Additionally, the implementation of Improvement SAE [22.85%] in observed Colleges was rated to a low extent.

Still in line with the recommendations of NCCE (2012) and NCAE (2012, 2015, 2023), this study found some evidences of Research or Experimental SAE (R/ESAE) present in the Colleges observed. The NCCE (2012) recommended that experimental stations or farms should be provided in Colleges of Education where students would conduct experiments in different areas of Agriculture. Specifically, it was observed that students conduct research in areas such as crop production, soil and animal science, agricultural economics and students are taught skills in agricultural research, however, there was little or no research in areas of was agricultural technology. Relatively, Research SAE [90%] was highly implemented in Agricultural Education programmes offered in Colleges of Education in Southeast Nigeria. However, this rating is subject to the views of the observers.

Observations made on Exploratory SAE (ESAE) show that some activities were present while some are absent in the Colleges of Education. These activities enable students to explore areas of agriculture by visiting agricultural enterprises and participating in workshops and seminars (IPCentre, 2021; CAERT, n.d), however, activities on participating in agricultural competitions were absent in observed Colleges of Education. This investigation found that some activities under Improvement SAEs like integrated pest management, precision farming, water management and adoption of hydroponics and aquaponics were absent in the five Colleges of Education, though activities on organic farming and soil conservation practices like terracing, mulching were present. Some literature emphasizes the importance of Improvement SAEs in accomplishing the objectives of Agricultural education, and also in promoting sustainable agriculture (Georgia FFA (nd) and Missouri Department of Elementary and Secondary Education (2013), hence it is essential for Agricultural Education should adequately implement ISAEs for students. However, based on the observer's rating, Improvement SAE [22.85%] was implemented to a low extent in observed Colleges.

Additionally, with regards to Directed College Laboratory SAE (DCLSAE), findings show that there were activities in areas such as crop production, livestock management and aquaculture and fishery, while none was present for hydroponics. In agreement, the NCCE (2012) recommended that agricultural education programs in Colleges of Education should have two properly equipped laboratories specifically designed for conducting experiments related to crops, soil, and livestock. Further investigation, shows that Directed Laboratory SAEs [50%] were moderately implemented in the Colleges observed. In addition, the findings of this study reveal that Agricultural Service Learning SAE (ASLSAE) is not implemented in Colleges of Education in South-East Nigeria. NCAE (2017) asserted that ASLSAE should be implemented in schools to develop societal consciousness in students, as well as establish linkages between schools and communities. Therefore, Agricultural Education programmes must design and implement ASLSAE. Further

inquiry into the methods utilized by lecturers of Agricultural Education in implementing SAE programmes in Colleges of Education reveals that the majority of the respondents agreed that some methods used include practical demonstrations, group projects, field trips, excursions, lecture methods, and laboratory work. However, the majority of the respondents did not agree that integrating technology (e.g., computer simulations and online resources) and lectures by guest speakers from the agricultural industry were methods used in delivering SAEs. More so, there was an equal level of agreement and disagreement among respondents on peer-to-peer learning (collaborative learning activity). These methods perceived by the respondents are in agreement with the recommended delivery methods of Agricultural Education programmes recommended by NCCE (2012).

Findings reveal that the majority of the respondents agreed that some barriers to implementing SAE programmes in the Colleges of Education in South-East Nigeria include insufficient funding, limited access to agricultural facilities and equipment, incompetency of some lecturers, lack of enabling administrative policies, inadequate professional development of lecturers, poor college and industry linkages and limited support and recognition of SAEs. These findings are consistent with the findings of different kinds of literature that have revealed some barriers to the implementation of SAE programmes, and also SBAEs in both Nigeria and other countries (Moore, 2017, Retallick, 2010; Famiwole & Kolawole, 2013; Asogwa, Ona and Gideon, 2022; Amuriyaga *et al.*, 2018; Onu, Ugwuoke and Asogwa, 2020; Ekele, Doom and Ngbongha, 2020; NAEC, 2015; Rubenstein and Thoron, 2015). Amuriyaga *et al.* (2018) also identified several obstacles to conducting agricultural practical activities, which are important components of SAEs, including inadequately equipped school farms, a lack of tools and equipment, large class sizes and grouping issues, a lack of practical work time, a shortage of skilled farm labourers, time restraints, and high material costs. Similar to NAEC (2015), SAE programs are impacted by a lack of resources to support students in coming up with ideas. In particular, Asogwa, Ona, and Gideon (2022) found that the lack of SAE program designs, inadequate infrastructure, restricted finance, and insufficient student involvement in SAEs are obstacles to the implementation of Supervised Agricultural Experiences (SAEs) in schools. These results support Moore's (2017) observations that SAEs lacked appropriate funding, forcing students to rely on their resources or ask for help from community people. Moore (2017) also pointed out that teachers struggled to manage their time for SAE activities and lacked the necessary training. These problems play a part in the poor planning for SAE programs. In agreement with these findings, two recent surveys conducted in Nigeria by Onu, Ugwuoke, and Asogwa (2020) and Ekele, Doom, and Ngbongha (2020) evaluated agricultural education programs. These studies generally discovered that there are few resources available to implement agricultural programs in colleges of education in South-East Nigeria, which reduces the effectiveness of the program, even though the findings of these studies were general and not focused on evaluating specific programs. This shows that a thorough investigation is required to properly assess both the implementation and accessibility of SAEs in colleges of education. The results of Amuriyaga et al. (2018), Onu, Ugwuoke and Asogwa (2020), and Ekele, Doom and Ngbongha (2020), as well as another study by Retallick (2010), conducted in the US, identified five barriers to SAE in schools. These barriers include the mechanics and structure of schools, the availability of resources, the perception or image of SAE, changing demographics and societal attitudes, and the agricultural education system itself. Retallick (2010) interprets these

findings as indicating a gap between experiences and learning outcomes related to SAE and the theoretical comprehension and practical implementation of SAE.

Conclusion and Recommendations

The observations and results of this study highlight the necessity of a thorough and successful implementation of SAE programs in South-East Nigerian colleges of education. Entrepreneurship SAE, Placement/Internship SAE, Improvement SAE, Research or Experimental SAE, Exploratory SAE, Directed College Laboratory SAE, and Agricultural Service Learning SAE should all receive adequate consideration. For SAE programs to be implemented successfully, it is essential to remove the impediments that have been identified, including resolving finance concerns, raising lecturer competency, improving access to facilities and equipment, and fortifying connections between colleges and industry. Agriculture education programs can more successfully prepare students for employment, entrepreneurship, and sustainable agriculture practices by addressing these issues and putting SAEs into practice. Based on the findings of this study, the researchers recommend the following:

- Since there is a clear absence of essential activities in Entrepreneurship SAE, such as managing greenhouses, business planning, customer relations, and financial management, NCCE should incorporate these activities into the agricultural education curriculum in Colleges of Education. Adequate resources, training, and support should be provided to lecturers to effectively implement Entrepreneurship SAE programs.
- The National Commission for Colleges of Education (NCCE) and the Federal Government should allocate sufficient funding to promote the presence and implementation of Entrepreneurship SAE programs in Agricultural Education.
- It is crucial for administrators of Agriculture Education programmes to expand and diversify the placement options available to students, ensuring they are exposed to a wide range of agricultural practices and industry-specific skills.
- Colleges of Education should collaborate with relevant stakeholders to establish partnerships and create opportunities for students to gain practical experiences in various agricultural sectors.
- The implementation of Improvement SAEs, which are important for promoting sustainable agriculture, was rated low. Administrators of Agriculture Education in Colleges of Education should focus on incorporating activities such as integrated pest management, precision farming, water management, and adoption of hydroponics and aquaponics into their agricultural education programs. Adequate resources, including well-equipped school farms and necessary tools and equipment, should be provided by the government to facilitate the implementation of Improvement SAEs. Professional development programs should be conducted for lecturers to enhance their knowledge and competency in delivering Improvement SAEs effectively.

Directions for Future Research

- Similar studies on evaluation of SAEs should be conducted in university-based agricultural education programmes.
- Fellow researchers should focus investigating strategies in overcoming barriers in implementing SAE programmes, as well as mechanisms for enhancement. Inquiry should also be made to ascertaining the effectiveness of supporting policy frameworks on SAEs in Nigerian tertiary institutions.

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