Utilizing Scaffolding for Effective Supervision of Postgraduate Research in Agricultural Education in Nigerian Universities: Challenges and Capacity Building Needs

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Abstract

Scaffolding is effective in teaching, coaching, and supervising students' research works, but Agricultural Education lecturers often do not adopt it for their supervision. What could be their challenges and requirements to effectively utilise scaffolding for supervision of students' research works remained a mirage in literature. Therefore, this study determined the challenges and capacity-building needs of lecturers in utilising scaffolding strategy for effective supervision of postgraduate students' research works in Agricultural Education in Nigerian universities. The study addressed three research questions and tested a single null hypothesis. The study adopted a descriptive survey research design. The population for the study was 49 lecturers in Agricultural Education. There was no sampling. The instrument used for data collection was the Lecturers' Challenges and Capacity Building Needs Supervision Questionnaire (LCCBNSQ). A reliability coefficient of 0.88 was obtained using Cronbach's alpha method of reliability. The weighted mean and Improvement Need-Performance Index (INPI) were used to answer the research questions, while Analysis of Variance was used to test the null hypothesis at the 0.05 level of probability. It was found that lecturers of Agricultural Education face 13 challenges and need capacity building on 20 practises in utilising scaffolding for effective supervision of postgraduate students' research work in Agricultural Education in Nigerian universities. It was recommended, among others, that university administrations organise capacity-building workshops for lecturers of Agricultural Education on the supervision of research in Nigerian universities.

Keywords: Challenges, Capacity building, Lecturers, Scaffolding, Supervision, Postgraduate students. Appropriately.

Introduction

Agricultural Education is a combination of knowledge and skills in agriculture and education. Agricultural Education, according to Chamoagne (2021), combines scholarship of agricultural and educational systems by linking technical areas of agriculture with humanistic dimensions. In the United States of America, Agricultural education is viewed as the teaching of agriculture, natural resources, and land management through hands-on experience and guidance to prepare students for entry-level jobs and further advanced agricultural jobs (Phipps, as cited in Movchan & Komisarenko, 2019). The content of the agricultural education curriculum includes horticulture, land management, turfgrass management, agricultural science, animal health care, machine and shop classes, health and nutrition, livestock management, biology courses, and so on. Agricultural Education exists at the elementary, middle school, secondary, post-secondary, and adult levels. The study further explained that:

1. elementary agriculture is taught in public and private schools and deals with such subjects as how plants and animals grow and how soil is formed and conserved;
2. Vocational agriculture trains people for jobs in production, marketing, and conservation;
3. College agriculture involves training people to teach, conduct research, or provide information to advance the field of agriculture and food science and

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4. General education in agriculture informs the public about food and agriculture.

Agricultural education that exits Nigerian universities falls into the category of college agriculture, which involves training undergraduate and postgraduate students on how to teach, conduct research, or provide information for individuals to advance the field of agriculture and food science in other ways (Asogwa, 2014).

Postgraduate students are described by Collins cited in Collins & Jehangir (2021) as learners who continue to study for an advanced degree after earning a bachelor's degree or other first degree in the same or related profession. In the view of Dai et al (2021) postgraduate students have obtained degrees from a university or other tertiary institutions and are pursuing studies for a more advanced qualification. In the context of this study, postgraduate students are individuals who have a first degree in agricultural education programme or in other related degree courses in Agriculture and are studying for a Masters (M.Ed. or M. Sc. (Ed.)) or Doctorate (Ph.D.) degree in Agricultural Education. In Nigeria, postgraduate students in Agricultural Education take a research course with a unit credit load ranging between 6 and 12, depending on the degree in view.

Research is a vital aspect of the agricultural education curriculum in Nigerian universities, especially at the postgraduate level. According to Bhardwaj (2019), research is the manipulation of things, concepts, or symbols for the purpose of generalisation and to extend, correct, or verify knowledge, whether that knowledge aids construction of theory or in the practice of an art. Kapur (2018), explained that research consists of enunciating the problem, formulating hypotheses, collecting the facts or data, analysing the facts, and reaching certain conclusions either in the form of solutions to the concerned problem or in certain generalisations for some theoretical formulation. Research as the creation of new knowledge and/or the use of existing knowledge in a new and creative way to generate new concepts, methodologies, and understandings (The University of New South Wales; 2013; Western Sydney University, 2020). It is a systematic investigation designed to develop or contribute to generalizable knowledge (U.S. Department of Health and Human Services, 2021). Research could include the synthesis and analysis of previous research that leads to new and creative outcomes. This definition of research, in the submission of the U.S. Department of Health and Human Services, encompasses pure and strategic research, basic research, applied research, and experimental research. Research, in this study, is a systematic and replicable process that identifies and defines problems, formulates hypotheses, or suggests solutions; collects, organises, and evaluates data to provide solutions to problems or formulate theories in Agricultural Education. In Nigerian universities offering Agricultural Education programme, research is usually conducted by students under the supervision of a lecturer as part of the requirement for the award of a Bachelor of Science in Education and a postgraduate (Diploma, Master's, or Doctorate) degree in Agricultural Education.

A lecturer, as posited by Oviawe (2020), is a person who has undergone approved professional training in education at appropriate levels and is capable of imparting knowledge, skills, and attitudes to the learners in a relevant programme. Isiwu and Okonkwo (2013) explained that a lecturer of agricultural education is an individual who has undergone a teacher preparatory programme at the university and is charged with the responsibility of imparting knowledge, skills, and attitudes in agriculture to students in a subject. In this study, a lecturer is an individual who has undergone training in the pedagogical and technical aspects of a programme in a university and is teaching relevant course(s) to student-teachers in a Nigerian university. One of the responsibilities of Higher education, according to the Association of Graduate Careers Advisory Services (AGCAS, 2021), is to supervise students' research activities, including final-year undergraduate projects and Masters or PhD dissertations. Similarly, in the Agricultural Education programme, lecturers with doctorate degrees teach relevant courses to postgraduate students, evaluate them, and engage in supervision of postgraduate students' research work for the award of the intended degree.

In the statement of Taylor & Neimeyer (2017), supervision involves the teaching of specific skills and competencies, helping the learner to develop self-sufficiency in the ongoing acquisition of skills and knowledge. Supervision sometimes includes an element of assessment and may require the provision of pastoral care for some students or trainees. Sweet et al. (2021) described supervision as an intervention provided by a senior member of a profession to a junior member or members of that same profession. This relationship is evaluative, extends over time, and has the simultaneous purposes of enhancing the professional functioning of the junior member(s), monitoring the quality of professional services offered to the clients, and serving as a gatekeeper for those who are to enter the particular profession. The University of Auckland (2010) posited that students' research supervision includes supervising students on a research degree provides supervision for students undertaking small-scale research projects within an undergraduate or taught master's programme. The university pointed out that irrespective of the approaches or styles adopted by the supervisors, they are expected to provide:

1. academic support to develop the knowledge and skills to achieve the highest standard of research;
2. regular feedback on the design, management, and analysis of data and information, the presentation of results, thesis content, and draughts;
3. advice on the standard of performance and progress to ensure timely completion;
4. names and credentials of suitable thesis examiners;
5. close and regular contact to support the supervisee(s) from commencement to the award of the intended degree; and
6. career advice and assistance during supervision.

Therefore, supervision is the process by which lecturers manage, monitor, and/or control the activities of

postgraduate students carrying out research work in Agricultural Education for the purpose of learning. During this process, the lecturers, here referred to as the supervisors, utilise different methods and styles of supervision, among which are diagnosis and scaffolding. A supervisor acts as a guide, mentor, source of information, and facilitator to student as they progress through a research project (Taylor, 2021). Scaffolding, in the explanation of Akamigbo and Eneja (2020), is an instructional technique whereby the teacher models the desired learning strategy or task, then gradually shifts responsibility to the students. It is a process through which a teacher adds support for students to enhance learning and aid in the mastery of tasks (Vanderbilt University, 2021). It means doing some of the work for the student who is not quite ready or experienced enough to accomplish a task independently. Reiser (2018), postulated that scaffolding is the support given during the learning process that is tailored to the needs of the student with the intention of helping the student achieve his or her learning goals. According to Reiser, instructional scaffolding is a temporal learning process designed to promote a deeper level of students' learning. Dominguez and Svihla (2023) stated that scaffolding is an adult controlling those elements of the task that are essentially beyond the learner's capacity, thus permitting them to concentrate on and complete only those elements that are within his range of competence. The control and support of the teacher or expert are gradually removed as students develop autonomous learning strategies, thus promoting their own cognitive, affective, and psychomotor learning (Onah, 2022). When teachers scaffold research supervision, they typically break up a learning experience, concept, or skill into discrete parts, give students the assistance they need to learn and carry out each part (Great Schools Partnership, 2015). Grévisse et al (2019), observed that scaffolding enables the learner to bridge the gap between the actual and the potential knowledge, depending on the resources or the kind of support that is provided. Scaffolding offers opportunities for supervisor-student interaction, giving supervisors the opportunity to diagnose students' research skills and adapt their support to students' needs (de Kleijn et al., 2015). The key features of scaffolding include a common goal, shared understanding, ongoing diagnosis and adaptive support, dialogues and interactions, fading, and the transfer of responsibility (West et al., 2021). The study emphasised that instructional scaffolding is used to help students in various ways, such as modelling a task, giving advice, providing coaching and supervising students' research work. Instructional scaffolding involves two major steps. The first step is the development of instructional plans to lead the students from what they already know to a deep understanding of new material (de Oliveira et al, 2021). Scaffolding plans must be written carefully, such that each new skill or bit of information students learn serves as a logical next step based upon what they already know or are able to do. The instructor must prepare to continuously assess student learning and to connect new information to the students' prior knowledge. The study continued that the second major step of instructional scaffolding is the execution of the plans, wherein the instructor provides support to the students at every step of the learning

process. In the context of this study, scaffolding is an instructional strategy whereby lecturers provide temporal support in steps for postgraduate students to acquire competence in carrying out research in Agricultural Education in universities.

There is no doubt that lecturers are faced with some challenges in utilising scaffolding for supervising postgraduate students' research work in Agricultural Education. A challenge is a task or situation that tests someone's ability (Collins, 2012). It also refers to difficulty in a job or career that tests one's ability or resources in a demanding but stimulating undertaking. In this regards, challenges are those difficult situations that lecturers experience or encounter when utilising scaffolding for supervision of post-graduate students' research works in Agricultural Education in Nigerian universities. Agricola et al. (2021) noted that supervisors struggle with the balance between intervening and scaffolding, on the one hand, and allowing students to find their own ways to develop their own problem-solving approaches, on the other hand (Todd et al., 2006; Vehviläinen & Löfström, 2016). Students are also challenged with striking a balance between being self-directed and autonomous and being dependent and asking for help (Gooria et al, 2021). Some supervisors offer much support, feedback, and explanations, making students passive in their research work, which affects their cognitive development, whereas other supervisors seem to be more autonomy-supportive to the students, who then take more responsibility in regulating their learning than other students do (Agricola et al., 2019).

Besides, the observation of the present study in the Agricultural Education programme in Nigerian universities is that there are various degrees of delay and frustration among postgraduate students during supervision of their research. A few postgraduate students of Agricultural Education creditably passed all their course work but could not obtain their intended certificate on time due to delay and frustration from supervision of their research work. Some postgraduate (master's and PhD) students have abandoned their research work completely because of frustration from supervision, while a few strong-minded students changed from one university to another, though in the same programme (Asogwa et al., 2014). The extent of this delay and frustration varies among students from different universities and individual lecturers (supervisors) depending on the nature of students, type of research, competence of the lecturers, and method of supervision, among other factors. In an interview by this study with two recently retired professors of Agricultural Education from the University of Nigeria, Nsukka, on what might be the possible causes of the delay in students' supervision of research work, the professors mentioned many issues, including challenges in modelling a style of supervision, competence of the lecturers (supervisors), and methods of supervision utilised, of which scaffolding ranked first. This suggested that the lecturers (supervisors), faced with some challenges in utilising scaffolding strategy, need capacity building for effective supervision of postgraduate students' research work to salvage the situations manifesting in delay and frustration.

Capacity building is described by Ewurum (2019) as the development of knowledge, skills, and attitudes in

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individuals and groups of people relevant to the design, development, and maintenance of institutional and operational infrastructures and processes that are locally meaningful. The United Nations Development Programme [UNDP] (2002); Perera and Hardie (2022) maintained that capacity building means building abilities, relationships, and values that enable organisations, groups, and individuals to improve their performance and achieve their development objectives. It includes strengthening the processes, systems, and rules that influence collective and individual behaviour and performance in all development endeavours. The UNDP stressed that capacity building refers to enhancing people's technical ability and willingness to play new developmental roles and adapt to new demands and situations. With reference to this study, capacity building is the act of enhancing the technical abilities of lecturers by utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education. If the challenges and capacity-building needs of lecturers in utilising scaffolding for effective supervision are determined, it could enable them to seek improvement programmes or make necessary adjustments to boost the total and timely graduation of postgraduate students of Agricultural Education from Nigerian universities. It could also heighten job satisfaction among lecturers (supervisors) in relation to supervision of postgraduate students' research works in Agricultural Education and enable students to understand the what, the why, and the how in every stage of their research works; hence, the need for this study.

Purpose of the study

The main purpose of this study was to determine the challenges and capacity-building needs of lecturers in utilising scaffolding for effective supervision of students' research works in Agricultural Education in Nigerian universities. Specifically, the study sought to:

1. identify the demographic variables of the respondents;
2. find out the challenges faced by lecturers in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education; and
3. determine the capacity-building needs of lecturers in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education.

Research Questions

1. What are the demographic variables of the respondents?
2. What are the challenges faced by lecturers in utilising scaffolding for effective supervision of students' research projects in Agricultural Education?
3. What are the capacity-building needs of lecturers in utilising scaffolding for effective supervision of students' research works in Agricultural Education?

Hypothesis

There is no significant difference in the mean ratings of the responses among professors, associate professors, and senior lecturers with PhDs in Agricultural Education on the challenges faced by lecturers in utilising scaffolding for effective supervision of students' research works in Agricultural Education.

Theoretical Framework

This study is hinged on Vygotsky's (1978) idea of the Zone of Proximal Development (ZPD). According to Vygotsky, there are two parts to a learner's developmental level: the "actual developmental level" and the "potential developmental level". The zone of proximal development represents "the distance between the actual developmental levels as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or collaboration with more capable peers" (Vygotsky, 1978).

In this context, the zone of proximal development represents the areas between what the postgraduate students do by themselves in research and that which they attained with the support of a more knowledgeable person known as the supervisor in Agricultural Education. The supervisor, through scaffolding, bridges the gap between what the supervisee knows and what he or she does not know in Agricultural Education research. Once the student gains the desired knowledge, skills, or attitude in research, the actual developmental level has been expanded and shifted (Khang et al., 2023). The ZPD changes constantly as the student learns new knowledge or ideas and progresses from what he or she cannot do to what he or she can do with help and then to what he or she can do without help (Figure 1). This trend makes scaffolding a perfect method of individualised instruction for research supervision in Agricultural Education.
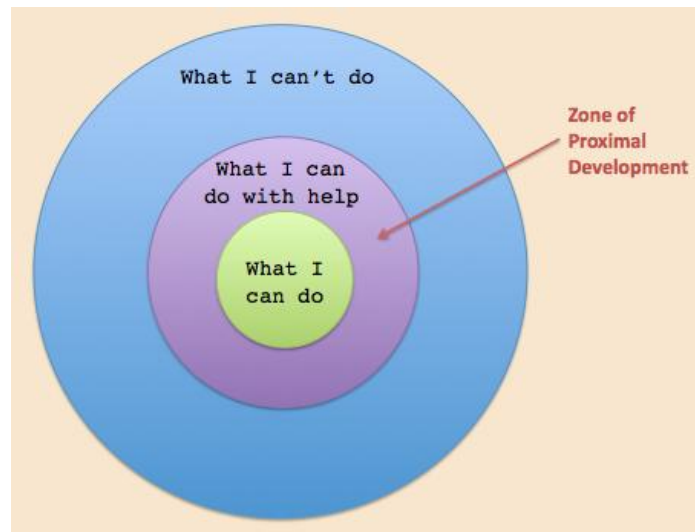
Figure 1: Adopted from Vygotsky, 1978

Importantly, ZPD enables supervisors to determine what the student conduct on his or her own research work and allows the student to do as much as possible without any assistance. Until students demonstrate mastery of new or difficult tasks in research, they are given more assistance or support from a supervisor. Larkin (2002) noted that student moves towards mastery of any aspect of the research work, the assistance or support is gradually decreased (fading) to shift the responsibility of learning from the supervisor to the student.

Therefore, the use of scaffolding as a method of supervision is always challenging where the supervisor does not understand what the students cannot do, what he or she can do with help, and what he or she can do without help for gradual withdrawal of support and independence. In any case, a few supervisors, probably experienced ones, could have some strategies to overcome such challenges to the utilisation of scaffolding for effective supervision of postgraduate students' research works in Agricultural Education in Nigerian universities.

Methodology

This study, which used a descriptive survey design, was carried out at Nigerian universities offering postgraduate programmes in Agricultural Education. The population for the study was 49 lecturers in Agricultural education, made up of 14 professors, 9 associate professors, and 26 senior lecturers. The entire population was involved in the study due to its manageable size.An instrument titled Lecturers' Challenges and Capacity Building Needs Supervision Questionnaire (LCCBNSQ) was developed and used for data collection. The LCCBNSQ was structured into two sections: 1 and 2, with Section 1 scaled into 4-point response categories of highly accepted, averagely accepted, lowly accepted, and not accepted with a corresponding nominal value of 4.3.2 and 1, respectively. Section 2 was framed into two categories: needs and performance. The needed category was structured into a 4-point response option of highly needed (4), averagely

needed (3), slightly needed (2), and not needed (1), while the performance category was structured into a 4-point response option of high performance, average performance, low performance, and no performance with a corresponding nominal value of 4.3.2 and 1, respectively.

The LCCBNSQ was validated by three professors: one from the Agricultural Education Department, one from the Science Education Department, Michael Okpara University of Agriculture, Umudike, and one retired professor from the Agricultural Education Department, University of Nigeria, Nsukka. Using the observations and corrections of the validates to improve the initial draft of the questionnaire, there were item mortalities ranging from 41 to 33 items that developed into the final instrument for data collection. The instrument was trial tested on seven respondents, one professor, and six senior lecturers in Agricultural Education from Ghana, Botswana, and Eswatini. The data was collected through their email addresses and analysed using the Cronbach's Alpha reliability method. The reliability coefficient of the 33 items was 0.88, indicating that the instrument was highly reliable since it was not dichotomously scored (García-Carpintero-Muñoz, et al 2023; Brasil et al, 2023).

A soft copy of the instrument was sent by the researchers to the respondents through their email addresses. After two weeks, a reminder was sent to those who had not returned a checked instrument. After another week, the remaining respondents were contacted to inform them and ascertain their willingness to participate in the study. Finally, 41 out of 49 copies of the instrument were checked, giving an 83.67% return rate. A call was placed to the email address of the respondents. Fifty-five copies of the questionnaire were administered to the respondents by the research assistants through face-to-face contact, but only 41 copies were returned, giving a 94.55% retrieval rate. The data collection process lasted for three weeks and three days between June 1 and June 25, 2022.

The data collected for the study was analysed using weighted mean, standard deviation, and the Improvement

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Need-Performance Index (INPI) to answer the research questions, and Analysis of Variance (ANOVA) was used to test the null hypothesis at the 0.05 level of probability since there were more than two groups of respondents. To identify the challenges faced by lecturers, the real limit of numbers is thus: 1–1.49 = highly accepted, 1.50–2.49 = lowly accepted, 2.50–3.49 = averagely accepted, and 3.50–4.00 = highly accepted, were used for decision-making. In testing the null hypotheses, a hypothesis of no significant difference was not rejected where the *p*-value was greater than or equal to the alpha-value 0.05 level of probability, while it was rejected where the *p*-value was less than the alpha-value 0.05 level of probability. To determine the need-performance gap among lecturers in Agricultural Education, the following steps were adopted:

- The weighted mean of each item in the needed category was calculated.
- The weighted mean of each item in the performance category was calculated.
- The difference between the two weighted mean values, that is, NPG (Need-Performance Gap), was calculated.

The value of NPG for each item indicated the capacity level of the lecturers on item.
Where NPG is zero, it means that capacity building is not needed for the item because the level at which the lecturers performed that item is equal to the level at which the item is needed. Where NPG is negative (-), it means capacity building is not needed for that item because the level at which the lecturers performed the item is higher than the level at which the item is needed. Where the NPG is positive (+), it means capacity building is needed because the level at which the lecturers performed the item is lower than the level at which it is needed (Adapted from Olaitan & Ndomi, 2000).

Ethical Considerations

The researchers wrote a letter for permission to the Heads of departments of Agricultural Education in the Universities used for the study. The instrument also had a consent letter for introduction and a request to the respondents before participation because it was voluntary. The instrument utilised in the study did not include any identifiable information, such as the name of the participants, which might be used to track their identities. This feature of the instrument provided the respondents with a sense of assurance about the long-term security and confidentiality of their data after the completion of the data collecting process. The email address and university of the respondents were kept secret, and only their rank and gender were recorded. Besides, the respondents had every right to withdraw from the study at any point in time because it was clearly stated to be voluntary. Treatment, analysis, and interpretation of the collected data were confidentially and honestly carried out for this academic purpose. This paper was tested and has an acceptable level of uniqueness against plagiarism.

Results

The results of the study were obtained from the research questions answered through the data collected, analysed, and presented in Figures 2 and 3, and Tables 1 and 2.
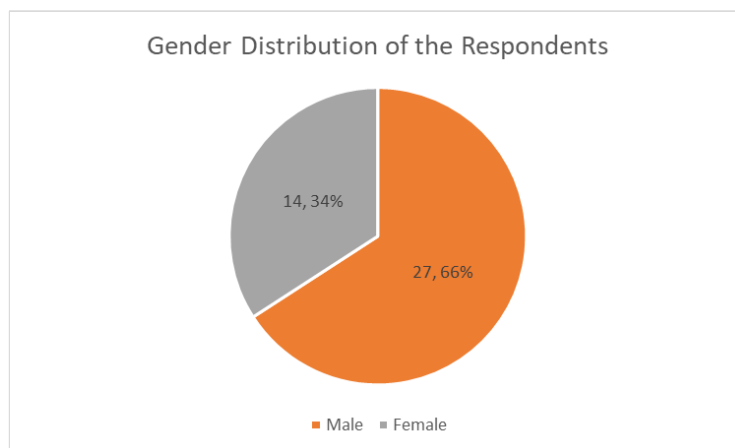

Figure 2: Gender

Figure 2 revealed that the 41 respondents constituted 27 (66%) males and 14 (34%) females. This implies that the opinions of both male and female respondents were represented in the study for a balanced result.
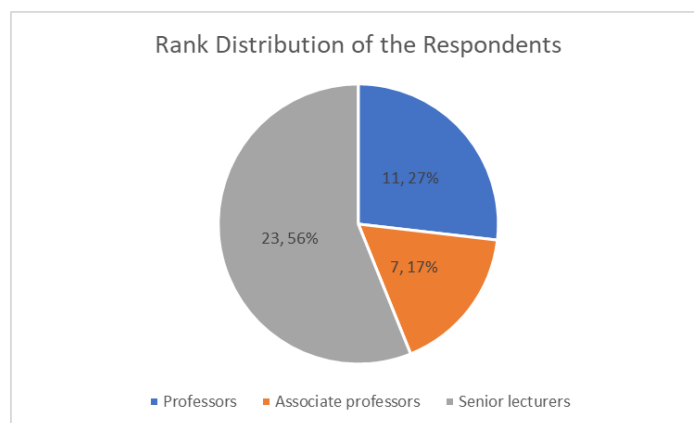
Figure 3: Rank

Figure 3 showed that among all the 41 respondents, 11 (27%) were professors, 7 (17%) were associate professors, and 23 (56%) were senior lecturers. Although the respondents were dominated by senior lecturers, all ranks were represented, and their opinions informed the decision about the result of the study.

Table 1: Mean rating and ANOVA on challenges faced by lecturers in utilising scaffolding for effective supervision of students' research works in Agricultural Education

S/No	Item statement on challenges	$\overline{X}$	S	p-value	Remarks
1	Planning for and implementing scaffolds in supervision is time consuming and demanding	3.52	0.63	0.22	Highly accepted*
2	Selecting appropriate scaffolds that match the diverse learning and communication styles of supervisees is difficult.	3.59	0.23	1.03	Highly accepted*
3	Not knowing the students well enough (their cognitive and effective abilities) to provide appropriate scaffolds.	3.47	0.60	0.31	Averagely accepted*
4	Inability to modify supervisees' topics correctly to withstand criticism from fellow lecturers or readers.	3.69	1.23	0.06	Highly accepted*
5	It is extremely difficult to identify activities, design, and model in a research topic for the supervisees at the outset.	3.01	0.93	0.71	Averagely accepted*
6	Lack of materials to provide to supervisees in their different research topics.	3.37	0.27	0.09	Averagely accepted*
7	The (ratio) number of supervisees per supervisor is large and does not encourage utilization of scaffolding	3.78	1.06	0.52	Highly accepted*
8	It is challenging to always create safe and supportive learning environment for all class of supervisees.	3.53	0.28	0.09	Highly accepted*
9	Lack of time and ability to read a supervisee's manuscript in bits regularly rather than chapter by chapter.	3.67	1.04	0.53	Highly accepted*
10	Monitoring supervisee's progress regularly especially on experimental research works.	3.86	1.09	0.07	Highly accepted*
11	Inability to accommodate supervisees' laziness to cope with assignment for progress.	3.11	0.91	0.76	Averagely accepted*
12	Suggesting effective strategies for all my supervisees to adopt during independent practices.	3.63	0.61	0.08	Highly accepted*
13	Knowing when to remove the scaffold for a supervisee to be independent of any support.	3.49	0.88	0.58	Averagely accepted*
	Grand total	3.52	0.75	0.36	Highly accepted*

$\overline{X}$ = mean, S = standard deviation, Number of respondents = 41

Table 1 revealed that 5 out of 13 items and the grand mean had a mean score ranging from 3.01 to 3.49 and were within the real limit described as averagely accepted. This indicated that the respondents accepted that the challenges indicated by these items were faced by them in utilising scaffolding for effective supervision of

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postgraduate students' research works in Agricultural Education. The table also revealed that 8 out of 13 items had mean scores ranging from 3.52 to 3.86 and were within the real limit described as highly accepted. This indicated that the lecturers accepted that the eight items were challenges faced by them in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education. Generally, the overall mean of the responses is 3.52, which is within the range of highly accepted. This indicated that the lecturers accepted that all the items were challenges faced by them in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education. The standard deviation ranged from 0.23 to

1.23, indicating that the respondents were close to each other in their responses.

The data on the hypotheses tested in Table 1 revealed that all 13 items had p-values ranging from 0.06 to 1.02, which were greater than the alpha-value of 0.05 level of significance. This indicated that there was no significant difference in the ANOVA scores of the professors, associate professors, and senior lecturers on the challenges faced by them in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education in Nigerian universities. Therefore, the null hypothesis of no significant difference was upheld.

Table 2: Need-Performance Gap Analysis of mean ratings of where capacity building on utilising scaffolding was needed

S/No.	Item Statement	$\overline{X}n$	$\overline{X}p$	$\overline{X}n\text{-}\overline{X}p$ NPG	Decision
1	Ask a supervisee to provide a list of researchable topics in your area of specialization.	3.37	3.70	-0.33	CBNN
2	Select a suitable topic that matches curriculum goal and students' need avoiding too easy and difficult ones.	3.29	3.22	0.07	CBN
3	Ask the student to define the problem and tasks in the topic to verify and clarify a supervisee' understanding.	3.67	3.43	0.24	CBN
4	Modify the topic based on the out of discussion or brainstorming with the supervisee.	3.28	2.83	0.45	CBN
5	Identify a research design or model for the study giving reasons to the supervisee	3.53	2.61	0.92	CBN
6	Identify activities to be engaged in by a supervisee while conducting and writing the research topic.	3.36	2.82	0.54	CBN
7	Sequence the identified activities for the supervisee for easy understanding and execution.	3.35	2.98	0.37	CBN
8	Direct the supervisee on how to start and progress by giving specific assignment on each contact.	3.68	2.48	1.20	CBN
9	Give room for a supervisee to ask question on each contact for clarification.	3.64	2.99	0.65	CBN
10	Support a supervisee's progress through provision of materials among others.	3.86	3.74	0.12	CBN
11	Read a supervisee's manuscript in bits to control, guide and direct his/her activities without frustration.	3.44	2.83	0.61	CBN
12	Adopt apprenticeship model by providing the supervisee with advice, examples, clue in theory and practice.	3.36	2.85	0.51	CBN
13	Discuss the next activity of a supervisee on each contact during supervision.	3.57	3.15	0.42	CBN
14	Monitor a supervisee's progress through regular feedback from assignments given on each contact.	3.52	3.33	0.19	CBN
15	Indicate to a supervisee the desired outcome before the completion of the research work.	3.31	2.67	0.64	CBN
16	Create a welcoming, safe, and supportive learning environment that encourages a supervisee to take risks and try alternatives	3.18	2.98	0.20	CBN
17	Encourage a supervisee to become less dependent on instructional supports as he/she works on tasks in research.	3.63	3.29	0.34	CBN
18	Suggest possible strategies for a supervisee to adopt during independent practices.	3.76	3.44	0.32	CBN
19	Transfer responsibilities to a supervisee for continuity.	3.14	2.91	0.23	CBN
20	Withdraw instructional scaffold from a supervisee on completion of his/her research work.	3.66	2.87	0.79	CBN
	Grand total	3.48	3.06	0.42	CBN

$\overline{X}$ = mean of needed, $\overline{X}$ = mean of performance, NPG= Need-Performance Gap, CBN= Capacity building needed, CBNN= Capacity Building Not Needed

Data in Table 2 showed that the need-performance gap values of nineteen (19) out of twenty (20) items and the grand mean ranged from 0.12 to 1.20 and were positive. This indicated that the lecturers needed capacity building for the 19 items. One (1) out of the 20 items had a need-performance gap value of -0.33 and was negative, indicating that the lecturers do not need capacity building on one item (item number 1). Generally, the overall mean of needed minus performance responses is 0.42 and was positive. This indicated that the lecturers needed capacity building on utilising scaffolding for effective supervision of postgraduate students' research work in Agricultural Education in Nigerian universities.

Discussion of Findings

The result of this study in Figure 2 showed that the respondents were dominated by male lecturers, which is in line with the observation of RUFORUM (2010) that even with a large female agricultural labour force, women were underrepresented in tertiary agricultural education. Overall, women account for one out of every five students in the agricultural sciences in Africa. In Cameroon, only 22 percent of the students were female, and the proportions were similar amongst the teaching staff (Mangheni et al., 2010).

Figure 3 revealed that the respondents were dominated by senior lecturers, followed by professors and associate professors as the minority, but the perception of all the ranks was accommodated for the scientific result of the study. Generally, the result is in alignment with the growth in the global population and the increasing number of universities starting Agricultural Education programmes. It could also explain why RUFORUM (2020) universities in Africa have sought opportunities to send their staff for post-graduate training abroad in a bid to strengthen research and training, at very high costs. To improve the quality of higher education at African universities, the Vice Chancellors of RUFORUM member Universities agreed to overcome the growing demand for doctoral-level scientists in Africa by increasing the proportion of academic staff with PhD qualifications (Mayada et al., 2016).

In Table 1, the lecturers of Agricultural Education accepted that they face 13 challenges in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education. The result is in consonance with the findings of Uko, Asogwa, and Olaitan (2011), in which it was found that six elements of education, eight elements of finance, nine elements of risk, and seven elements of marketing were constraints preventing youth's participation in agricultural production. The findings of the study are in consonance with the findings of Aheto-Tsegah (2011) on Education in Ghana: Status and Challenges, where the author noted that the education system was faced with major challenges in access and participation. Some of the challenges include the low enrolment of girls, low quality in terms of poor pupil learning achievement, an inadequate supply of trained and qualified teachers, resulting in extreme class sizes, and a lack of resources for teaching and learning. The finding in Table 1 is a mere confirmation of the fact that

challenges crop up at every point in time in the life of an individual since there is variation in a process. On the hypothesis tested, it was found out that there was no significant difference in the ANOVA scores of the professors, associate professors, and senior lecturers on the challenges faced by them in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education in Nigerian universities. This implied that the professional experience of the professors, associate professors, and senior lecturers did not significantly influence their opinion on the challenges that they face in utilising scaffolding for effective supervision of postgraduate students' research works in Agricultural Education. It also implies that there are challenges in the supervision of postgraduate students' research works, irrespective of one's experience.

However, the lecturers supervise different postgraduate students with various backgrounds, intelligence quotients, and mindsets, among others; therefore, it was expected that they would experience challenges in adjusting to accommodate different classes of students. On the other hand, it was anticipated that the long-time experience of the professors involved in the study could reduce or nullify their challenges in utilising scaffolding for supervision, but the result of the hypothesis tested contradicted this expectation, confirming the belief that the categories of lecturers have the same training and work in the same environment.

The result in Table 2 revealed that lecturers of Agricultural Education needed capacity building on 19 practises in utilising scaffolding for effective supervision of postgraduate students' research work in Agricultural Education in Nigerian universities. The items included selecting a suitable topic that matches the curriculum goal and students' needs, avoiding too easy and too difficult ones, modifying the topic based on the outcome of discussion or brainstorming with the supervisee, identifying activities to be engaged in by the supervisee while conducting and writing the research topic, and supporting the supervisee's progress through the provision of materials, among others. The findings were in consonance with the findings of Olaitan et al. (2011) in a study on the competency capacity building needs of teachers of Agriculture in utilising e-assessment for processing and storing students' performance scores in junior secondary schools in Enugu State. The study found out that teachers of Agriculture required capacity building in 17 competencies in correct typing posture and typing the keys of the computer, 18 competencies in keyboard basics and pointing devices, and 35 competencies in e-assessment for effectiveness in processing students' performance scores and storing them. Miller et al. (2011), on the professional capacity building needs of teachers for effective teaching of technology curriculum to students in junior secondary schools in Lagos State, found that teachers of basic technology needed capacity building in 5 items: planning, 6 items: implementing, 6 items: evaluating instruction, 6 items: programme management, 14 items: classroom/laboratory management, and 29 items: teaching the contents of the basic technology curriculum to students in junior secondary schools. Huang (2017) suggests that for teachers to guide students

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effectively, they should be guided by five Rs, which are recalling, Recapturing (capturing emotions, accomplishments, and challenges), Relating (identifying connections with previous materials or experiences), Rationalising (identifying patterns, creating meaning), and Redirecting (thinking about the future). The finding is quite factual because one of the principles of education is that learning is a continuous process until one is dead, coupled with the fact that nothing is as constant as change. That is, the capacity-building needs of lecturers as identified by this study justify the need for professors and other lecturers to learn more and build their capacity in line with current changes in utilising scaffolding strategy for effective supervision of postgraduate students' research works as far as they are in the university system.

Conclusion

Research work is one of the courses that postgraduate students must pass for the award of any intended postgraduate degree in Agricultural Education at universities. The supervision of the research work is carried out by the professors and other qualified lecturers with doctorate degrees. Lecturers face challenges in utilising scaffolding for effective supervision of postgraduate students' research works in agricultural education in Nigerian universities. They therefore needed capacity building in utilising scaffolding for effective supervision of postgraduate students' research works in agricultural education in Nigerian universities.

Recommendation

Based on the findings of the study, it was therefore recommended that:

1. There is a need for the administrators of all the Universities offering Agricultural Education programmes in Nigeria to recruit more female lecturers for gender equality in Africa.
2. Supervisors of postgraduate students' research works should understand what a supervisee can do without and with help before rendering support of any kind and should gradually reduce such assistance for mastery and independence as the student progresses.
3. Governing councils in Nigerian universities should employ more lecturers in Agricultural Education to reduce the workload per lecturer in the supervision of postgraduate research in Agricultural Education.
4. The university administration should, on a regular basis, organise capacity-building workshops for lecturers of Agricultural Education on the supervision of research work in Nigerian universities using scaffolding.
5. Universities should adopt the policy that lecturers (supervisors) should at least organise or attend one capacity-building workshop programme every two years.

Conflict of Interest

The author declares that there are no competing interests since he solely funded and conducted the study.

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