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Competency Gaps and Training Needs of Agricultural Education Lecturers in Agricultural Mechanization: A Case of College of Education, Akwanga

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ABSTRACT

The study focused on competency improvement needs of lecturers of Agricultural Education for teaching Agricultural Mechanization in Colleges of Education Akwanga, Nasarawa State – Nigeria. Three objectives of the study were translated to seven research questions and three null hypotheses for the study. The hypotheses were tested as 0.05 level of significance. A survey research design was adopted for the study. A total of 18 Lecturers of Agricultural Education in Colleges of Education Akwanga were used. A structural questionnaire called Competency Gap Training Needs Questionnaire (CGNQ) was developed and used for data collection. Five (5) experts validated the instrument. The reliability coefficient of the instrument was 0.89 using Alpha – Cronbach Method. Weighted mean and Improvement Needs Index (INI) was used to answer research questions while t-test statistics was used to test the hypotheses. The study found out that lecturers of Agricultural Education in Colleges of Education Akwanga, Nasarawa State - Nigeria did not posses competencies for teaching Agricultural Mechanization. It was also found out that Agricultural Education Lecturers in College of Education Akwanga required Competency Gap Training Needs in all the stages of teaching Agricultural Mechanization. It was therefore recommended among others that refresher training is required to help the lecturers to improve the needed competencies in teaching Agricultural Mechanization. This can be done through attending constant conferences, seminars, and workshops organized for training lecturers teaching Agricultural Mechanization in College of Education Akwanga, Nasarawa State – Nigeria.

Keywords: *Competency, Improvements, Teaching and Agricultural Mechanization*

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INTRODUCTION

Competency is knowledge, skills and attitude one can develop in every aspect of lifelong occupation. It is the ability of an individual to do a job properly (Olaitan, Asogwa & Abu, 2013). Competency in the opinion of Ekele (2019) is the knowledge and skill which an individual acquires in order to perform a given task. In the context of this study, competency is the knowledge, skills and attitudes required by lecturers of Agricultural Education for teaching in colleges of education.

A College of Education as viewed by Amusan (2009) is

an institution of higher learning which has the primary role of training teachers to be awarded a teaching certificate of Nigeria Certificate in Education (N.C.E). According to the Federal Colleges of Education Act of Nigerian (1986), a college of education is an institution of higher learning for providing courses in teaching, and training in technology, applied sciences, geography, commerce, arts, social sciences, and agricultural education.

Improvement needs in the opinion of Abdullahi and Ajoku (2015), is a concept that is concerned with creating or enhancing the ability of a person to performed specific tasks and attain national development objectives. In the opinion of Harington (2014) improvement needs involves improving a process to make it effective and adaptive. In the context of this study, improvement needs is the knowledge, skills and attitudes required by lecturers of Agricultural Education for acceptable performance in the teaching of Agricultural Mechanization in College of Education Akwanga. This level of competency improvement needs required by the lecturers of Agricultural Education can be obtained through training and retraining or through self-development.

Similarly, Alawa **(**2015) reported that tools and equipment for teaching Agricultural Mechanization in tertiary levels were inadequate and this constrain lecturer to present content theoretically to student mostly during lecture method. Agricultural mechanization; refers to the use of mechanization, and or is the art of using machineries to hasten or make production easy, to accomplish task and reduce fatigue and the use of human labour in order to produce better quality goods and services (Gabriel, 2014). Almasi, Kiyami, and Lavaimi, (2005). Odigboh, (2009), opined that Agricultural mechanization is the use of power and machinery (hand tools, implements and more complex machines) to assist in undertaking operations which contribute to the production and processing of agricultural crops, livestock and fisheries products. The lecturers have the sole responsibility of teaching Agricultural Mechanization towards the achievement of the stated objectives (Alawa, Abanyam, & Okeme 2015). Despite the activities if lecturers of Agricultural Education in teaching the Agricultural Mechanization towards achieving the objectives of Agricultural Mechanization in College of Education Akwanga, it was observed that performance in Agricultural Mechanization was below average.

In College of Education Akwanga, it has been observed that lecturers performance in teaching Agricultural Mechanization, both in theory and practical aspects is below standard. The low performance could be due to so many factors, but the lecturers of Agricultural Education have been a major factor implicated or blamed for this low level of performance. To improve the level of performance of Lecturers of Agricultural Education for teaching Agricultural Mechanization, there is the need to improve the level of competence of lecturers of Agricultural Education (Gabriel, 2015). It will reveal that the level of knowledge, skills and attitude lecturer possess for teaching the subject and what level they need to reach for an acceptable standard. This give the gap which is the dimension at which improvement needs is required. Lecturers of Agricultural Education in College of Education Akwanga are graduates from the universities like their counterparts lecturers in College of Education Akwanga. Hence lecturers of Agricultural Education in College of Education Akwanga are not exonerated from the researchers observations and comments, therefore, there is the need for competency improvement needs of lecturers of Agricultural Education in Colleges of Education Akwanga. Specifically, the study seeks to identify:

i. The Competency Gap Training needs of lecturers of Agricultural Education in implementing for teaching Agricultural Mechanization in College of Education Akwanga.
ii. The Competency Gap Training Needs to lecturers of Agricultural Education in communication for teaching Agricultural Mechanization in College of Education Akwanga.
iii. The Competency Gap Training Needs need of Lecturers in Agricultural Education in evaluating the teaching of Agricultural Mechanization in College of Education Akwanga, Nasarawa State.

Agricultural mechanization; refers to the use of mechanization, and or is the art of using machineries to hasten or make production easy, to accomplish task and reduce fatigue and the use of human labour in order to produce better quality goods and service (Gabriel, 2014). Almasi, Kiyami, and Lavaimi, (2005) observed that Agricultural mechanization involves the selection, operation, utilization, and maintenance of mechanization devices and systems in agricultural operations, their management in crop production for the utmost benefits of man. Odigboh. (2009), opined that Agricultural mechanization is the use of power and machinery (hand tools, implements and more complex machines) to assist in undertaking operations which contribute to the production and processing of agricultural crops, livestock and fisheries products.

Research Questions

The study answered the following research questions:
i. What are the competency gap training needs of lecturers in implementing knowledge for teaching of Agricultural Mechanization in North Central Nigeria?
ii. What are the competency gap training needs of lecturers in communication for teaching of Agricultural Mechanization in North Central Nigeria?
iii. What are the competency gap training needs of lecturers in evaluating teaching of Agricultural Mechanization in North Central, Nigeria?

Hypotheses

The following hypotheses were formulated and tested at

Table 1: Competency Gaps and Training Needs of Agricultural Education Lecturers in Agricultural Mechanization: A Case of College of Education, Akwanga (n= 18)

S/N	Competencies gaps in Implementing Instruction	$\bar{X}n$	$\bar{X}_p$	NPI ($\bar{X}n$ -$\bar{X}_p$)	Remarks
1	Revise the previous lesson to link it with the day lesson	3.31	2.01	1.30	CIN
2	Test the students' entry behaviour with stimulating questions and should be in the direction of the lesson	3.25	1.98	1.27	CIN
3	Inform the students indirectly the objectives of the lesson	3.24	2.02	1.22	CIN
4	Deliver the new topic step by step	3.18	1.99	1.19	CIN
5	Show the relatedness of one content area to another	3.23	2.03	1.20	CIN
6	Ask stimulating questions to guide the students response	3.22	1.98	1.24	CIN
7	Listen to students response to questions and correct as appropriate	3.28	2.10	1.18	CIN
8	Introduce learning materials where necessary	3.18	2.00	1.18	CIN
9	Utilize aids for the instruction	3.09	2.12	0.97	CIN
10	Employ varieties of teaching methods	3.24	2.02	1.22	CIN
11	Reinforce learning where necessary	3.06	2.09	0.97	CIN
12	Assess performance as student practice and correct errors	2.92	1.99	0.93	CIN
13	Allow the students to make corrections and give approval	2.92	1.91	1.01	CIN
14	Give assessment in form of test and assignment	2.85	1.89	0.96	CIN
15	Provide feedback to students on the test or assignment	2.90	1.86	1.04	CIN
16	Give appropriate grade for the score to the students	3.14	1.87	1.27	CIN
	Grand NPI	3.12	1.99	1.13	CIN

$\bar{X}n$ = Mean of Needed Category, $\bar{X}_p$ = Mean of Performance Category, n = number of respondents, NPI = Needed-Performance Index, CIN = Competency Improvement Needed,

0.05 level of significance:

i. There is no significant difference in the mean rating of agricultural education lecturers in Federal and State colleges of education on the competency gap training needs of lecturers' in implementing the teaching of Agricultural Mechanization in Colleges of Education in North Central Nigeria.

ii. There is no significant difference in the mean rating of agricultural education lecturers in Federal and State colleges of education on the competency gap training needs s of lecturers' in communicating Agricultural Mechanization contents in Colleges of Education in North Central Nigeria.

iii. There is no significant difference in the mean rating of agricultural education lecturers in Federal and State colleges of education on the competency gap training needs of lecturers' in evaluating Agricultural Mechanization instructions in Colleges of Education in North Central Nigeria.

METHODOLOGY

The study adopts a survey research design. Survey research design according to Emaiku (2015) is a plan or blueprint which specifies how data relating to a given problem should be collected and analyzed. A survey research design is one in which a group of people or items are studied by collecting and analyzing data from only a few people or items considered to be representative of the entire group. The survey research design is suitable for the study because the study gathers information from respondents on the competency gap training needs of lecturers of Agricultural Education for teaching of Agricultural Mechanization in College of Education Akwanga.

The sample size for this study was 18 respondents. This is all Agricultural Education lecturers in College of Education Akwanga. There was no sampling because the population could be effectively managed by the researcher.

The instrument used for data collection was a 39 item structured questionnaire which was developed by the researcher known as the Competency Gap Training Needs Questionnaire (CGNQ). The instrument had two categories of response to needs and performance rating. The need category had a four-point response scale such as Highly Needed (HN) 4, Averagely Needed (AN) 3, Slightly Needed (SN) 2, and Not Needed (NN) 1. While the performance category rating had a four-point response scale of High Performance (HP) 4, Average Performance (AP) 3, Low Performance (LP) 2, and Non-Performance (NP) 1. The instrument is divided into seven clusters on the bases of the research questions for the study.

They include: planning for teaching, organizing for teaching, implementing for teaching, farm practical component for teaching, communicating for teaching, expert knowledge for teaching, and evaluating for teaching.

Weighted mean and improvement need index (INI) was used to answer research questions. To determine the mean needed, the real limit of numbers was utilized as follows: 3.50-4.00 (Highly Needed), 2.50-3.44 (Averagely Needed), 1.50-2.49 (Slightly Needed) 1.00-1.49 (Not Needed) any item whose weighted mean is 1.5 or above is regarded as needed while any item whose weighted mean is less than 1.5 is regarded as not needed.

The null hypothesis was tested using a t-test at a 0.05 level of significance. The result of the data analysis was used for the production of improvement needs of lecturers which shall be used as a training package for lectures of Agricultural Education for teaching Agricultural Mechanization in College of Education Akwanga.

RESULTS

Data in Table 1 reveals that all 15 items have need-performance index that ranges from 1.03 to 1.27, with a

Table 2: T-Test Analysis of Mean Ratings of Respondents on Competency Gap Training Needs of Agricultural Education Lecturers in Implementing Agricultural Mechanization Instruction in College of Education Akwanga, Nigeria

Status	N	Mean	Std.	Std. Error Mean	df	Sig.	t-cal	Alpha Value	Remark
College of Education, Akwanga Lecturers	18	1.9576	0.07787	0.11055	172	0.730	0.346	0.05	NS, NR

N= Number of respondents, COE: College of Education, Std = Standard deviation, df = degree of freedom, Sig. = P-value; t-cal = t-calculated value; P >.05, NS = Not significant, NR =Not rejected.

Table 3: Competency gap training needs of Agricultural Education Lecturers in Communicating Agricultural Mechanization Contents in College of Education, Akwanga Nigeria (n= 18)

S/N	Competencies in Communication	$\bar{X}n$	$\bar{X}_p$	NPI ($\bar{X}n$ -$\bar{X}_p$)	Remarks
1	Understand students level of expression	2.70	1.97	0.73	CIN
2	Organized simple symbols in teaching	2.57	1.87	0.70	CIN
3	Use simple words during teaching	3.38	1.74	1.64	CIN
4	Allow students to express their ideas	3.32	1.96	1.36	CIN
5	Give room for lecturer – students interaction	3.30	2.05	1.25	CIN
6	Give room for students – students interaction	3.28	2.05	1.23	CIN
7	Students are fully involved in feedback process	3.26	2.03	1.23	CIN
	Grand NPI	3.11	1.95	1.16	CIN

$\bar{X}_n$ = Mean of Needed Category, $\bar{X}_p$ = Mean of Performance Category, n = number of respondents, NPI = Needed-Performance Index, CIN = Competency Improvement Needed

grand indexof 1.18 and was positive. This result indicates that Agricultural Education lecturers needed the competency gap training in all 16 items in implementing the teaching of Agricultural Mechanization in College of Education Akwanga.

Table 2 presents a t-test analysis of the mean ratings of respondents on the competency gap training needs of lecturers in College of Education Akwanga in communicating the teaching of Agricultural Mechanization in College of Education Akwanga at p>0.05. The Table shows a p-value of 0.701 which is greater than the alpha value of0.05 at 172 degrees of freedom (0.701>0.05). This implies that the test is not significant hence, there is no statistically significant difference in the mean ratings of the responses of Agricultural Education lecturers in College of Education Akwanga on the competency gap training needs in implementing the teaching of Agricultural Mechanization in College of Education Akwanga. Therefore, the null hypothesis was not rejected.

Data in Table 3 reveals that all 16 items have need-performance index that ranges from 0.76 to 1.38, with a grand index of 1.04 and was positive. This result indicates that Agricultural Education lecturers needed the competency gap training needs in evaluating all 16 items in evaluating for teaching Agricultural Mechanization in College of Education Akwanga.

Data in Table 1 reveals that all the 15competency items have need-performance index that range from 0.93 to 1.30, with a grandindex of 1.13 and were positive. This result indicated that Agricultural Education lecturers needed competency improvement in all the 16 items in implementing Agricultural Mechanization instruction in North Central, Nigeria.

Hypothesis 1

There is no significant difference in the mean ratings of Agricultural Education lecturers in federal and state colleges of Education on the competency improvement needs of lecturers in implementing Agricultural Mechanization instruction in North Central, Nigeria. The data for testing hypothesis 1 is presented in Table 2.

Table 2 presents t-test analysis of the mean ratings of respondents on the competency improvement needs of lecturers in implementing Agricultural Mechanization instruction in Colleges of Education in North Central, Nigeria at p >.05. The Table shows a p-value of 0.730 which is greater than the alpha value .05 at 172 degrees of freedom (0.730 >.05). This implies that the test is not significant hence, there is no statistical significant difference in the mean ratings of the responses of Agricultural Education lecturers in federal and state colleges of Education on the competency improvement needs of lecturers in implementing Agricultural Mechanization instruction in College of Education Akwanga. Therefore, the null hypothesis was not rejected.

Data in Table 3 reveals that all the competency items have need-performance index that range from 0.70 to 1.64, with a grandindex of 1.16 and were positive. This result indicates that Agricultural Education lecturers needed competency gap training needs in all the 7 items in communicating Agricultural Mechanization contents in College of Education Akwanga.

Hypothesis 2

There is no significant difference in the mean ratings of Agricultural Education lecturers in federal and state colleges of Education on the competency gap training needs of lecturers in communicating Agricultural Mechanization contents in College of Education Akwanga.

The data for testing hypothesis 6 is presented in Table 4.

Table 4 presents t-test analysis of the mean ratings of respondents on the competency improvement needs of lecturers in communicating Agricultural Mechanization contents in Colleges of Education in North Central, Nigeria

Table 4: T-Test Analysis of Mean Ratings of Respondents on Competency Gap Training needs of Agricultural Education Lecturers in Communicating Agricultural Mechanization Contents in College of Education, Nigeria

Status	N	Mean	Std.	Std. Error Mean	df	Sig.	t-cal	Alpha Value	Remark
College of Education, Akwanga Lecturers	18	1.9403	0.17560	0.10907	172	0.855	0.183	0.05	NS, NR

N= Number of respondents, COE: College of Education Akwanga, Std = Standard deviation, df = degree of freedom, Sig. = P-value; t-cal = t-calculated value; P >.05, NS = Not significant, NR =Not rejected.

Table 5: Competency Gap Training Needs of Agricultural Education Lecturers in Evaluating Agricultural Mechanization Instruction in College of Education Akwanga (n= 18)

6.5	Competencies in Evaluation	$\bar{X}n$	$\bar{X}_p$	NPI ($\bar{X}n$ - $\bar{X}_p$)	Remarks
1.	Identify the key topics to be evaluated in Agricultural Education	3.26	2.06	1.20	CIN
2.	State the objectives in relation to the topic to ascertain achievement	3.21	2.05	1.16	CIN
3.	Develop test, examination and, relating sheet	3.22	2.04	1.18	CIN
4.	Make use of assessment methods that address the course objectives e.g. performance test	3.18	2.03	1.15	CIN
5.	Allocate time for each assessment activity	3.23	2.02	1.21	CIN
6.	Use formal test to understand what the students leant	2.54	2.03	0.51	CIN
7.	Use formal class assignment to understand what the students leant	2.56	1.79	0.77	CIN
8.	Use formal projects and standardized achievement test to understand what the students leant	2.51	1.72	0.79	CIN
9.	Establish criteria for students performance	2.53	1.71	0.82	CIN
10.	Ascertain the level to which students have attain the stated instructional objectives in Agricultural Education	2.53	1.71	0.82	CIN
11.	Assess improvement of instructional methods in Agricultural Education	2.53	1.71	0.82	CIN
12.	Involve students in self- assessment activities	2.48	1.71	0.77	CIN
13.	Provide students with feedback of their performance	2.47	1.68	0.79	CIN
14.	Report evaluation results to school management	2.49	1.67	0.82	CIN
15.	Keep assessment records of each student.	2.46	1.70	0.76	CIN
16.	Develop a table of specification for evaluating students, as a necessary competency for lecturers of agricultural education	2.73	1.67	1.06	CIN
	Grand NPI	2.74	1.83	0.91	CIN

$\bar{X}_n$ = Mean of Needed Category, $\bar{X}_p$ = Mean of Performance Category, n = number of respondents, NPI = Needed-Performance Index, CIN = Competency Improvement Needed

Table 6: T-Test Analysis of Mean Ratings of Respondents on Competency Gap Training Needs of Agricultural Education Lecturers in Evaluating Agricultural Mechanization Instruction in College of Education Akwanga .

Status	N	Mean	Std.	Std. Error Mean	df	Sig.	t-cal	Alpha Value	Remark
State COE Lecturers	18	1.8065	0.06688	0.09496	172	0.624	0.491	0.05	NS, NR

N= Number of respondents, COE: College of Education, Std = Standard deviation, df = degree of freedom, Sig. = P-value; t-cal = t-calculated value; P >.05, NS = Not significant, NR =Not rejected.

at p >.05. The Table 4 shows a p-value of 0.855 which is greater than the alpha value .05 at 172 degrees of freedom (0.855 >.05). This implied that the test was not significant hence, there was no statistical significant difference in the mean ratings of the responses of Agricultural Education lecturers in federal and state colleges of Education on the competency improvement needs of lecturers in communicating Agricultural Mechanization contents in North Central, Nigeria. Therefore, the null hypothesis was not rejected.

Data in Table 5 reveals that all the competency items have need-performance index that range from 0.51 to 1.21, with a grandindex of 0.91 and were positive. This result indicated that Agricultural Education lecturers needed competency improvement in all the 16 items in evaluating Agricultural Mechanization instruction in North Central, Nigeria.

Hypothesis 3

There is no significant difference in the mean ratings of Agricultural Education lecturers in federal and state colleges of Education on the competency improvement needs of lecturers in evaluating Agricultural Mechanization instruction in North Central, Nigeria.The data for testing hypothesis 6 is presented in Table 6.

Table 6 presents t-test analysis of the mean ratings of respondents on the competency improvement needs of lecturers in evaluating Agricultural Mechanization instruction in Colleges of Education in North Central, Nigeria at p >.05. The Table shows a p-value of 0.624 which is greater than the alpha value .05 at 172 degrees of freedom (0.624 >.05). This implied that the test was not significant hence, there was no statistical significant difference in the mean ratings of the responses of Agricultural Education lecturers in federal and state colleges of Education on the competency improvement needs of lecturers in evaluating Agricultural Mechanization instruction in North Central, Nigeria. Therefore, the null hypothesis was not rejected.

Conclusion

This study has identified critical competency gaps among Agricultural Education lecturers at the College of Education, Akwanga, particularly in the domains of

instruction, communication, and evaluation of agricultural mechanization content. Quantitative analysis revealed that lecturers consistently rated their performance lower than the required competency levels, indicating a systemic need for professional development.

In instructional delivery, the highest gaps were observed in revising previous lessons to link with new content (NPI = 1.30), testing students' entry behavior (NPI = 1.27), and informing students of lesson objectives (NPI = 1.22). The overall Grand NPI for instructional competencies was 1.13, underscoring widespread deficiencies in lesson planning and execution.

Communication skills also showed significant gaps, with the use of simple words during teaching recording the highest NPI of 1.64, followed by allowing students to express ideas (NPI = 1.36) and promoting lecturer-student interaction (NPI = 1.25). The Grand NPI for communication stood at 1.16, suggesting that lecturers struggle to effectively engage students in the learning process.

Evaluation competencies were comparatively weaker, with a Grand NPI of 0.91. While some areas such as identifying key topics (NPI = 1.20) and allocating time for assessments (NPI = 1.21) showed moderate gaps, others like using formal tests (NPI = 0.51) and keeping assessment records (NPI = 0.76) revealed inconsistent evaluation practices.

Statistical analysis using t-tests confirmed that these gaps were not significantly different across respondents (p-values: 0.730 for instruction, 0.855 for communication), indicating that the challenges are systemic rather than individual.

To address these gaps, it is recommended that lecturers participate in regular training programs, including workshops and seminars facilitated by recognized bodies such as Technical Vocational Education and Training (TVET). Institutional support through modern teaching resources and financial incentives will be essential to enhance instructional quality and improve student outcomes in agricultural mechanization education.

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