

## DEVELOPMENT AND VALIDATION OF PSYCHOMOTOR EVALUATION INSTRUMENT FOR EFFECTIVE BROILER CHICKENS PRODUCTION SKILLS AMONG SENIOR SECONDARY SCHOOLS IN ABIA STATE

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### Abstract

*Production of broiler chickens is a profitable poultry business that gives quick returns on investment. As fast-growing birds, they mature in eight weeks attaining a market weight of 2.5-2.8kg under good management. It is important to train students and evaluate them using the psychomotor skill guide so that they acquire the skills and become professionals in the world of work. To achieve this, this study developed a Broiler Production Evaluation Guide (BPEG) for evaluating students' broiler production business. Research and development design (R&D) was adopted. The population was 153 respondents comprising 26 poultry farmers and 127 Agricultural Teachers. The purposive sampling was used to select 15 poultry farmers and 75 Agricultural teachers as masters of the occupation. A 31-item Broiler Production Evaluation Guide Questionnaire (BPEGQ) was developed and administered to 15 poultry farmers for construct validation because they are the masters of the occupation. Data from the construct validation was used to assemble BPEG and subjected the elicited responses from farmers on content agreed for inclusion in the BPEG to factor analysis. Result showed that all 31 psychomotor skill items were suitable for inclusion on a five-point Likert scale with a mean of 3.0 and above. A reliability coefficient ranging from 0.70-0.93 showed that the 31-item BPEG is reliable. The inter-rater reliability is high over time. The pre-test and post-test using the developed BPEG showed a significant difference from t-test analysis which conforms to the effectiveness of the BPEG. It was recommended, among others, that Senior Secondary Schools should adopt the BPEG for evaluating their students.*

**Keywords:** Development and validation, Psychomotor skill, Evaluation guide, Broiler production.

### Introduction

Broiler production is a profitable poultry business. As a fast growing breed of birds, broiler matures at 8 weeks under good management attaining a market weight of 2.5 – 2.8kg. Returns on investment is perhaps the fastest of all agricultural returns (Oloror and Otu, 2018) in the farm animals' enterprise. This makes broiler production a popular agri-business among farmers and Secondary School students who could leverage this technology window to achieve self-reliance and eschew idleness and social menace. Despite the leading role of poultry production in the livestock industry in Nigeria, the production of broiler chickens has slowed down. The challenges inherent in broiler enterprise vary according to different research findings. To some researchers, the challenges are high rate of diseases and pest attack (Aromolaran, *et al*; 2013) and lack of access to loan facilities and technical know-how. In a study by John (2015), the researcher found out that the management practices carried out by farmers include but not limited to cost of feed, security, availability of water, regular replacement of litter and vaccination against diseases. The researcher noted the problems as inadequate capital, expensive feeds and equipment, disease outbreak, expensive vaccines, expensive veterinary services and low patronage of live birds due to few restaurants and hotels in the municipality. Consequently, many practicing farmers have been frustrated out of the business and intending ones are scared to go into it.

Similarly, Fadimu *et al* (2020) found out that the major problems poultry farmers encounter are inadequate capital, pests and diseases incidence, lack of credit facility and high cost of feeding. In spite of all these challenges that surround the poultry industry, there are still prospects in it. Derby and Karitha (2016) asserted that the prospects of poultry production is market access. To reduce the rate of mortality of poultry to the barest minimum, the hatchery industry should be inspected by relevant agencies to ensure that healthy day-old chicks are produced under good hygienic conditions (Anosike, *et al* 2015). Agriculture is both a science and vocational subject and should be taught to Senior Secondary students vocationally for self-reliance. To achieve the objectives set out in the curriculum, the FRN (2014) articulates the aim of education at the Secondary School level to include: “provision of technical knowledge and vocational skills necessary for agricultural, industrial, commercial and economic development”. This policy document defines the ultimate aim of education at both the Secondary and Primary School levels by stating that while Primary School curriculum aims to inculcate literacy, numeracy and ability to communicate effectively as a foundation for scientific and reflective thinking, secondary schools are to inculcate technical and vocational skills for self-reliance. Acquisition of saleable skills by students can be instrumental to stemming the tide of social insecurity. Vocational education is that aspect of educational process involving, in addition, to generate education, the study of technologies to acquire the ability to perform a task in science and science related courses and acquisition of practical skills, attitude and knowledge relating to occupations in various sectors of economic and social life (FRN, 2014). The goal of this form of education, according to this policy document include but not limited to: provide the technical knowledge and vocational skills necessary for agricultural, commercial and economic development through a curriculum of general educational and workshop practice. Education for self-reliance focuses on the impartation of skills to the learner and production of low level manpower obtainable at the Secondary School or Technical College levels. Any education system that can adequately prepare a low level manpower to create goods and services (production) and manage business ventures will discourage the current uncontrollable quest for paper qualification which is characterized by rhetoric, cosmetic and spurious education, examination malpractice and certificate racketeering. The concept of self-reliance is composed of being responsible, disciplined, confident and independent. It is the ability to think and act independently and to decide what one should do.

To achieve this feat in the education system, the need for a paradigm shift in the mode of evaluation of students from dominant paper-pencil examinations to the use of observational tools to evaluate students’ performances becomes imperative. This is what Nigeria needs at this time as mass unemployment and economic meltdown stare the nation in the face. The FRN (2013) stressed the need for graduates of Senior Secondary Education to become artisans and craftsmen/technicians on graduation as holders of National Technical Certificate (NTC), National Business Certificate (NBC), Advanced National Technical Certificate (ANTC) and Advanced National Business Certificate (ANBC) to be able to operate at the sub-professional level. Unfortunately, the National Board for Technical Education (NBTE) and National Business and Technical Education Board (NABTEB) as well as the West African Examinations Council (WAEC) have all failed to produce the needed manpower who can think for themselves and respect the dignity of labour. This is because the mode of examinations of these evaluation agencies is pre-dominantly paper-pencil rather than pragmatic education that employs observational techniques as a mode of examination. It has become essential to equip the younger generation with the necessary knowledge and skills to engage in agricultural practices and agribusinesses effectively (Talbert, *et al.*, 2022). The primary objective of agricultural education is to inculcate in students’ knowledge and skills to make them self-reliant in various arrears of agricultural occupations. This area of study has emerged as an entrepreneurial form of education which aims at training students for professions in agriculture (Amadi, 2017). Agricultural

Education plays an important role in the development of entrepreneurial interest of students (Amadi & Nnodim, 2018; Amadi & Gibson, 2020). Skills possessed by students act as a motivator to engage in agri-preneurship. This result can only be achieved when the teacher changes from the conventional mode of assessment to the use of psychomotor evaluation instruments such as checklist or rating scale to determine the level of students' performances. Moses, Medugu, Mohammed and Wafudu (2017) asserted that the assessment of psychomotor skills can be carried out by evaluation of the chronological process in which the tasks is carried out (process evaluation) or evaluation of the finished task or product (product evaluation). The purpose of psychomotor evaluation in this study is to ensure that the student can manipulate tools and equipment and scientific application to attain the task specification that can serve as a valid and reliable predictor of skills acquisition in broiler production. Evaluation instrument takes into consideration the step-by-step process of the psychomotor activities to the completion of the task and finished products rather than relying on the conventional paper-pencil achievements tests to determine proficiency in the course. The instrument serves both as a training manual and a tool to determine the extent to which the students can demonstrate practical competencies using a checklist or rating scale while the teacher observes the student perform the operation involved (Ombugus and Ogbuanya, 2014). For the developed instrument to worth its salt, it must possess psychometric properties such as validity and reliability to indicate the quality and usefulness (Adamu, Dawha and Kamar, 2015; Nworgu, 2006). A reliable test or evaluation instrument gives consistent results upon repeated measurement on the same individual (Frenkel, Wallen & Hyun, 2012). The mode of evaluation employed by the school to determine proficiency of learners in a course of study re-shape their mindset to believe that the ultimate aim of education is to develop the ability to do something practically. The much orchestrated education for work would be promoted if a techno guide is used in evaluating students' level of performance in vocational and technological studies. A techno guide refers to the step-by-step guidelines on scientific knowledge used in a practical way for arriving at a product. It is against this backdrop that the researcher deemed it necessary to develop and validate a Broiler Production Evaluation Guide (BPEG) that could be used to assess students' mastery of skills involved in profitable production of broiler chickens

### **Statement of Problem**

Broiler enterprise is a fast-growing agribusiness that if Senior Secondary School students are properly groomed in the technology, it could sustain them while in school and also form an economic basis to fall back on after graduation. At least five production cycles a year rearing 150 birds each production season could yield a total amount of two million, two hundred and sixty thousand Naira (2,250,000) depending on the cost of feeds and technical knowledge. The cost-benefit analysis carried out showed that. Unfortunately, many practicing adult farmers and intending youths are scared to embark on the business when they consider the frustrations inherent in it. Lack of technical know-how, diseases and pests incidence and sudden outbreak among other challenges constitute a great setback. Consequently, the production of white meat which is one socially acceptable meat remains perpetually low. Unemployment and examination malpractice among youths is one of the causes of insecurity in our land today arising from use of paper-pencil examination to determine academic proficiency. It is against this backdrop that the researcher decided to develop and validate a psychomotor instrument to serve both as a guide to train and evaluate the students' performance in broiler technology. Technology education employs observational techniques involving demonstration by the teacher while the learner observes. On the other hand, the teacher assesses the learner based on the pre-determined criteria to find out the degree of skill acquisition. Possession of saleable skills in the production of broiler chickens will encourage the youths to be meaningfully engaged and also eschew examination malpractice.

### **Purpose of the Study**

The purpose of this study was to develop and validate a Broiler Production Evaluation Guide (BPEG) for profitable production of broiler chickens in Senior Secondary Schools. Specifically the study sought to:

1. Identify psychomotor skills as agreed by the teachers and poultry farmers for inclusion in the Broiler Production Evaluation Guide (BPEG) for evaluating students' psychomotor skills in broiler production.
2. Field-test the preliminary form of the BPEG to determine the reliability/stability over time.
3. Find out the inter-rater's reliability of the Broiler Production Evaluation Guide (BPEG) to determine the agreement among the raters.

### **Research Questions**

1. What are the psychomotor skill items agreed by teachers and poultry farmers suitable for inclusion in the Broiler Production Evaluation Guide (BPEG)?
2. What is the reliability of the Broiler Production Evaluation Guide?
3. What is the inter-rater's reliability of the Broiler Production Evaluation Guide (BPEG)?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance:

H<sub>01</sub>: There is no significant difference in the responses of urban and rural/male and female poultry farmers and extension agents on the psychomotor skills items considered suitable for inclusion in the BPEG.

H<sub>02</sub>: There is no significant difference in the performance of urban and rural poultry farmers when rated using the BPEG.

### **Methods**

The study adopted research and development (R&D) design aimed at development and validation of Broiler Production Evaluation Guide (BPEG) for profitable production of broiler chickens. R&D design is an institutionalized research programme that aims at developing and testing the efficacy of educational products and services which may be textbooks, equipment or curricular (Nworgu, 2006). Gall *et al*; (2003) defined R&D as an industry-based development model in which the findings of research are used to design new products and procedures which then are systematically field-tested, evaluated and refined until they meet specified criteria of effectiveness, quality or standard. Three research questions and two hypotheses were developed and formulated respectively to guide the study. The study had a population of 153 respondents comprising 26 poultry farmers and 127 Agriculture teachers. The sample was 90 respondents comprising 15 poultry farmers and 75 Agriculture teachers who are masters of the occupation and were randomly selected. The researcher developed a 31-item Broiler Production Evaluation Guide Questionnaire (BPEGQ) that was administered to 15 poultry farmers and 75 Agriculture teachers. The BPEG was constructed and validated by three experts and subjected to Factor Analysis. This was to determine suitable psychomotor skill items for inclusion in the guide. Information gathered from the BPEGQ were used to form the BPEG. The BPEGQ was a five-point Lickert scale with response options of Highly Suitable (HS), Suitable (S), Moderately Suitable (MS), Unsuitable (US) and Highly Unsuitable (HU) for each psychomotor skill item values of 5, 4, 3, 2 and 1 respectively while the assembled BPEG was a five-point rating scale with scoring descriptions of Excellent (E), Very Good (VG), Good (G), Poor (P), and Very Poor (VP) for each psychomotor skill item with corresponding values of 5, 4, 3, 2 and 1 respectively. The assembled BPEG was field-tested on using rural and urban farmers by three raters to determine the agreement among them over time using the Scientific Package of the Social Sciences (SPSS 2011) to analyze data from BPEG. A reliability coefficient of 0.70 and above

signified an acceptable coefficient for the agreement. A mean of 3.0 was taken as the cut-off point for determining the suitability of the psychomotor skill item. This means that a mean of 3.0 and above was considered as Suitable (S) while a mean less than 3.0 was considered as Unsuitable (US). A kappa of 0.50 and above signified an acceptable level of agreement in the inter-rater's reliability or agreement required for three raters (G-Wet, 2014). Test of hypothesis used t-test at 0.05 level of significance. Any hypothesis with P-value greater than 0.05 ( $P > 0.05$ ) was not significant and was accepted, otherwise, it was significant and as such rejected.

## Results

**Research Question 1:** What are the psychomotor skill items as agreed by teachers and poultry farmers suitable for inclusion in the Broiler Production Evaluation Guide (BPEG)?

**Table 1:** Mean responses of respondents on psychomotor skills suitable for inclusion in the Broiler Evaluation Guide (BPEG)

| S/N                                                    | PSYCHOMOTOR SKILL ITEMS                                                                        | n  | $\bar{x}$ | Remark   |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------|----|-----------|----------|
| <b>Skill Items on Planning</b>                         |                                                                                                |    |           |          |
| 1                                                      | Ability to prepare feasibility study of the project                                            | 15 | 3.89      | Suitable |
| 2                                                      | Ability to provide capital for housing, feeding, equipment and drugs                           | 15 | 4.17      | Suitable |
| 3                                                      | Choice of breed (for egg, meat or both)                                                        | 15 | 4.39      | Suitable |
| 4                                                      | Ability to determine system of rearing (e.g. deep litter, battery cage)                        | 15 | 4.87      | Suitable |
| 5                                                      | Ability to locate reputable source of stock                                                    | 15 | 4.11      | Suitable |
| 6                                                      | Ability to build the house (with brooding Chamber and rearing sections)                        | 15 | 4.50      | Suitable |
| 7                                                      | Ability to provide adequate floor spacing (3m X 3m for 100 chicks and growers/m <sup>2</sup> ) | 15 | 4.11      | Suitable |
| 8                                                      | Ability to locate source of litter materials                                                   | 15 | 4.03      | Suitable |
| 9                                                      | Ability to provide a regular source of Clean water                                             | 15 | 4.06      | Suitable |
| 10                                                     | Ability to locate source of feed and vaccines                                                  | 15 | 4.12      | Suitable |
| 11                                                     | Ability to locate market outlets (buyers)                                                      | 15 | 4.22      | Suitable |
| 12                                                     | Ability to clean and disinfect the house (2-3 days before chicks arrive)                       | 15 | 4.00      | Suitable |
| 13                                                     | Ability to spread litter (a day) before chicks arrive                                          | 15 | 4.40      | Suitable |
| 14                                                     | Ability to procure paraphernalia (drinkers, feeders, etc.)                                     | 15 | 4.41      | Suitable |
| 15                                                     | Ability to provide sources of heat and light                                                   | 15 | 4.02      | Suitable |
| 16                                                     | Ability to purchase feed and vaccines                                                          | 15 | 4.31      | Suitable |
| <b>Skill Items on Brooding (0-4<sup>th</sup> Week)</b> |                                                                                                |    |           |          |
| 17                                                     | Ability to heat up the brooder house and provide a foot dip                                    | 15 | 4.11      | Suitable |
| 18                                                     | Ability to feed chicks adlib and water regularly                                               | 15 | 4.13      | Suitable |
| 19                                                     | Ability to vaccinate chicks with Lasota 1/0 against New castle 1 <sup>st</sup> day             | 15 | 4.50      | Suitable |

|                                                       |                                                                                                                                                                     |    |             |               |
|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-------------|---------------|
| 20                                                    | Ability for 2 <sup>nd</sup> vaccination with Gumboro 10 days old + vitalitye                                                                                        | 15 | 4.13        | Suitable      |
| 21                                                    | Ability for 3 <sup>rd</sup> vaccination with Keproceryl Antibiotics 17 days old                                                                                     | 15 |             | Suitable      |
| 22                                                    | Ability for 4 <sup>th</sup> vaccination with water-soluble Lasota 24-28 days (4weeks) old                                                                           | 15 | 4.14        | Suitable      |
| <b>Skill Items on Rearing (5-8<sup>th</sup> week)</b> |                                                                                                                                                                     |    |             |               |
| 23                                                    | Ability for 5 <sup>th</sup> vaccination 30 days old with a mixture of 2 spoonful embazine forte plus 2 spoonful of prococ in 20 litres of water against Coccidiosis | 15 | 4.19        | Suitable      |
| 24                                                    | Ability to change feed from starter to grower mash                                                                                                                  | 15 | 4.20        | Suitable      |
| 25                                                    | Ability to feed growers adlib                                                                                                                                       | 15 | 4.15        | Suitable      |
| 26                                                    | Ability to maintain a high standard of sanitation                                                                                                                   | 15 | 4.00        | Suitable      |
| 27                                                    | Ability to avoid stale feed and water                                                                                                                               | 15 | 4.05        | Suitable      |
| 28                                                    | Ability to administer 6 <sup>th</sup> vaccination with embazine forte + prococ                                                                                      | 15 | 4.13        | Suitable      |
| 29                                                    | Ability to mature broiler at 56-60 days (8 weeks) at a market weight of 2.5-2.8kg                                                                                   | 15 | 4.12        | Suitable      |
| <b>Skill Items on Marketing (8 Weeks)</b>             |                                                                                                                                                                     |    |             | <b>Remark</b> |
| 30                                                    | Ability to sell mature broiler before the expiration 70 <sup>th</sup> day (9 weeks)                                                                                 | 15 | 4.13        | Suitable      |
| 31                                                    | Ability to sell manure to crop farmers                                                                                                                              | 15 | 4.11        | Suitable      |
| <b>Cluster mean</b>                                   |                                                                                                                                                                     |    | <b>4.12</b> |               |

**KEY:**  $n$  = Number of Respondents,  $\bar{x}$  = Mean of responses of poultry farmers

Data in Table 1 indicates that the mean ( $\bar{x}$ ) of responses of poultry farmers on the psychomotor skill items considered suitable for inclusion in the BPEG ranged from 3.89 to 4.50 with a cluster mean of 4.12. These results indicate that poultry farmers considered all 31 psychomotor skill items suitable for inclusion in the BPEG.

**Research Question 2:** What is the reliability/stability of the Broiler Production Evaluation Guide (BPEG) over time?

**Table 2:** Reliability/stability coefficient of the BPEG

| S/N                    | PSYCHOMOTOR SKILL ITEMS                                                 | n  | r    | Remark           |
|------------------------|-------------------------------------------------------------------------|----|------|------------------|
| <b>Planning Skills</b> |                                                                         |    |      |                  |
| 1                      | Ability to prepare feasibility study of the project                     | 15 | 0.90 | High reliability |
| 2                      | Ability to provide capital for housing, feeding, equipment and drugs    | 15 | 0.81 | High reliability |
| 3                      | Choice of breed (for egg, meat or both)                                 | 15 | 0.83 | High reliability |
| 4                      | Ability to determine system of rearing (e.g. deep litter, battery cage) | 15 | 0.87 |                  |
| 5                      | Ability to locate reputable source of stock                             | 15 | 0.80 | High reliability |
| 6                      | Ability to build the house (with brooding Chamber and rearing sections) | 15 | 0.77 |                  |

|                                                |                                                                                                                                                                     |    |      |                  |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------|------------------|
| 7                                              | Ability to provide adequate floor spacing (3m X 3m for 100 chicks and growers/m <sup>2</sup> )                                                                      | 15 | 0.72 | High reliability |
| 8                                              | Ability to locate source of litter materials                                                                                                                        | 15 | 0.91 | High reliability |
| 9                                              | Ability to provide a regular source of Clean water                                                                                                                  | 15 | 0.75 | High reliability |
| 10                                             | Ability to locate source of feed and vaccines                                                                                                                       | 15 | 0.93 | High reliability |
| 11                                             | Ability to locate market outlets (buyers)                                                                                                                           | 15 | 0.70 | High stability   |
| 12                                             | Ability to clean and disinfect the house (2-3 days before chicks arrive)                                                                                            | 15 | 0.79 | High stability   |
| 13                                             | Ability to spread litter (a day) before chicks Arrive                                                                                                               | 15 | 0.82 | High stability   |
| 14                                             | Ability to procure paraphernalia (drinkers, feeders, etc.)                                                                                                          | 15 | 0.77 | High stability   |
| 15                                             | Ability to provide sources of heat and light                                                                                                                        | 15 | 0.72 | High stability   |
| 16                                             | Ability to purchase feed and vaccines                                                                                                                               | 15 | 0.74 | High stability   |
| <b>Brooding Skills (0-4<sup>th</sup> week)</b> |                                                                                                                                                                     |    |      |                  |
| 17                                             | Ability to heat up the brooder house and provide a foot dip                                                                                                         | 15 | 0.78 | High stability   |
| 18                                             | Ability to feed chicks adlib and water regularly                                                                                                                    | 15 | 0.72 | High stability   |
| 19                                             | Ability to vaccinate chicks with Lasota 1 <sup>st</sup> /0 against New castle 1 <sup>st</sup> day                                                                   | 15 | 0.80 | High stability   |
| 20                                             | Ability for 2 <sup>nd</sup> vaccination with Gumboro 10 days old + vitalityte                                                                                       | 15 | 0.81 | High stability   |
| 21                                             | Ability for 3 <sup>rd</sup> vaccination with Keproceryl Antibiotics 17 days old                                                                                     | 15 | 0.85 | High stability   |
| 22                                             | Ability for 4 <sup>th</sup> vaccination with water-soluble Lasota 24-28 days (4weeks) old                                                                           | 15 | 0.80 | High stability   |
| <b>Rearing Skills (5-8<sup>th</sup> week)</b>  |                                                                                                                                                                     |    |      |                  |
| 23                                             | Ability for 5 <sup>th</sup> vaccination 30 days old with a mixture of 2 spoonful embazine forte plus 2 spoonful of prococ in 20 litres of water against Coccidiosis | 15 | 0.90 | High stability   |
| 24                                             | Ability to change feed from starter to grower mash                                                                                                                  | 15 | 0.89 | High stability   |
| 25                                             | Ability to feed growers adlib                                                                                                                                       | 15 | 0.85 | High stability   |
| 26                                             | Ability to maintain a high standard of sanitation                                                                                                                   | 15 | 0.92 | High stability   |
| 27                                             | Ability to avoid stale feed and water                                                                                                                               | 15 | 0.90 | High stability   |
| 28                                             | Ability to administer 6 <sup>th</sup> vaccination with embazine forte + prococ                                                                                      | 15 | 0.93 | High stability   |
| 29                                             | Ability to mature broiler at 56-60 days (8 weeks) at a market weight of 2.5-2.8kg                                                                                   | 15 | 0.90 | High stability   |
| 30                                             | Ability to sell mature broiler before the expiration 70 <sup>th</sup> day (9 weeks)                                                                                 | 15 | 0.81 | High stability   |
| 31                                             | Ability to sell manure to crop farmers                                                                                                                              | 15 | 0.74 | High stability   |

**KEY:**  $n$  = Number of poultry farmers,  $r$  = reliability coefficient

Data in Table 2 indicate that the 31 psychomotor skills in the BPEG possess a reliability coefficient ranging from 0.70 to 0.93. The 31 items possessed very high and high stability over time confirming the 31-item instrument as possessing high reliability

**Research Question 3: What is the inter-rater's reliability of the BPEG?**

Table 3: Inter-rater's reliability of BPEG using Kappa's statistics

| S/N                                            | PSYCHOMOTOR SKILL ITEMS                                                                                                                                             | n | r    | Remark    |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|------|-----------|
| <b>Planning Skills</b>                         |                                                                                                                                                                     |   |      |           |
| 1                                              | Ability to prepare feasibility study of the project                                                                                                                 | 3 | 0.81 | Agreement |
| 2                                              | Ability to provide capital for housing, feeding, equipment and drugs                                                                                                | 3 | 0.72 | Agreement |
| 3                                              | Choice of breed (for egg, meat or both)                                                                                                                             | 3 | 0.80 | Agreement |
| 4                                              | Ability to determine system of rearing (e.g. deep litter, battery cage)                                                                                             | 3 | 0.76 | Agreement |
| 5                                              | Ability to locate reputable source of stock                                                                                                                         | 3 | 0.79 | Agreement |
| 6                                              | Ability to build the house (with brooding Chamber and rearing sections)                                                                                             | 3 | 0.73 | Agreement |
| 7                                              | Ability to provide adequate floor spacing (3m X 3m for 100 chicks and 3 growers/m <sup>2</sup> )                                                                    | 3 | 0.82 | Agreement |
| 8                                              | Ability to locate source of litter materials                                                                                                                        | 3 | 0.90 | Agreement |
| 9                                              | Ability to provide a regular source of Clean water                                                                                                                  | 3 | 0.78 | Agreement |
| 10                                             | Ability to locate source of feed and vaccines                                                                                                                       | 3 | 0.71 | Agreement |
| 11                                             | Ability to locate market outlets (buyers)                                                                                                                           | 3 | 0.75 | Agreement |
| 12                                             | Ability to clean and disinfect the house (2-3 days before chicks arrive)                                                                                            | 3 | 0.74 | Agreement |
| 13                                             | Ability to spread litter (a day) before chicks Arrive                                                                                                               | 3 | 0.75 | Agreement |
| 14                                             | Ability to procure paraphernalia (drinkers, feeders, etc.)                                                                                                          | 3 | 0.76 | Agreement |
| 15                                             | Ability to provide sources of heat and light                                                                                                                        | 3 | 0.72 | Agreement |
| 16                                             | Ability to purchase feed and vaccines                                                                                                                               | 3 | 0.80 | Agreement |
| <b>Brooding Skills (0-4<sup>th</sup> week)</b> |                                                                                                                                                                     |   |      |           |
| 17                                             | Ability to heat up the brooder house and provide a foot dip                                                                                                         | 3 | 0.73 | Agreement |
| 18                                             | Ability to feed chicks adlib and water regularly                                                                                                                    | 3 | 0.79 | Agreement |
| 19                                             | Ability to vaccinate chicks with Lasota ( $\frac{1}{0}$ ) against New castle 1 <sup>st</sup> day                                                                    | 3 | 0.71 | Agreement |
| 20                                             | Ability for 2 <sup>nd</sup> vaccination with Gumboro 10 days old + vitalyte                                                                                         | 3 | 0.71 | Agreement |
| 21                                             | Ability for 3 <sup>rd</sup> vaccination with Keproceryl Antibiotics 17 days old                                                                                     | 3 | 0.73 | Agreement |
| 22                                             | Ability for 4 <sup>th</sup> vaccination with water-soluble Lasota 24-28 days (4weeks) old                                                                           | 3 | 0.73 | Agreement |
| <b>Rearing Skills (5-8<sup>th</sup> week)</b>  |                                                                                                                                                                     |   |      |           |
| 23                                             | Ability for 5 <sup>th</sup> vaccination 30 days old with a mixture of 2 spoonful embazine forte plus 2 spoonful of prococ in 20 litres of water against Coccidiosis | 3 | 0.72 | Agreement |
| 24                                             | Ability to change feed from starter to grower mash                                                                                                                  | 3 | 0.75 | Agreement |

|    |                                                                                     |   |      |           |
|----|-------------------------------------------------------------------------------------|---|------|-----------|
| 25 | Ability to feed growers adlib                                                       | 3 | 0.76 | Agreement |
| 26 | Ability to maintain a high standard of sanitation                                   | 3 | 0.71 | Agreement |
| 27 | Ability to avoid stale feed and water                                               | 3 | 0.73 | Agreement |
| 28 | Ability to administer 6 <sup>th</sup> vaccination with embazine forte + prococ      | 3 | 0.72 | Agreement |
| 29 | Ability to mature broiler at 56-60 days (8 weeks) at a market weight of 2.5-2.8kg   | 3 | 0.78 | Agreement |
| 30 | Ability to sell mature broiler before the expiration 70 <sup>th</sup> day (9 weeks) | 3 | 0.89 | Agreement |
| 31 | Ability to sell manure to crop farmers                                              | 3 | 0.81 | Agreement |

**Key:** K = Kappa statistics, *n* = Number of raters

Data in Table 3 indicate that three raters showed agreement among themselves in terms of how they rated poultry farmers on the psychomotor skill items based on the acceptable kappa value of 0.5 or above. In overall, the BPEG (comprising 31 skill items) was adjudged to possess acceptable inter-rater agreement, in rating the psychomotor performances of poultry farmers in their production process.

Table 3 indicates that the three raters exhibited an acceptable level of agreement among themselves in terms of how they rated the psychomotor skill items exhibited by the performers of the tasks on the acceptable kappa value of 0.5 or above. In all the 31 psychomotor skill items possess acceptable inter-rater agreement in rating the psychomotor performances of the farmers in rearing broiler chickens.

**Hypothesis 1:** There is no significant difference in the mean responses of the poultry farmers and agriculture teacher's on the psychomotor skill items considered suitable for inclusion in the BPEG. Hypothesis 1 is presented in Table 4.

**Table 4:** The t-test Analysis on the responses of poultry farmers and agriculture teachers on the psychomotor skill items considered suitable for inclusion in the BPEG

| Groups of Responses | <i>x</i> | SD   | n  | df | t     | P    | Decision  |
|---------------------|----------|------|----|----|-------|------|-----------|
| Poultry farmer      | 4.5      | 0.53 | 15 | 88 | -1.33 | 0.20 | NS accept |
| Teacher             | 4.8      | 0.42 | 75 |    |       |      |           |

Key:  $\bar{x}$  = mean response of poultry farmers and teachers, SD = Standard Deviation, n = Number of respondents, DF = Degree of Freedom, T = Observed t value, P = Probability value, 0.05 = Level of Significance, NS = Not significant

Data in Table 4 indicate that there is no significant difference in the responses of poultry farmers and teachers ( $p > 0.05$ ) on the psychomotor skill items considered suitable for inclusion in the BPEG. The cluster mean ( $\bar{X}$ ) responses of poultry farmers and teachers considered suitable for inclusion in the BPEG ranged from 4.5 – 4.8 indicating that all 31 psychomotor skill items were considered suitable for inclusion in the BPEG.

**Hypothesis 2:** There is no significant difference in the performance of urban and rural poultry farmers when rated using the BPEG.

**Table 5:** The t-test analysis of difference between scores of urban and rural poultry farmers when rated over time

|           | <b>n</b> | <b><math>\bar{x}</math></b> | <b>SD</b> | <b>df</b> | <b>t</b> | <b>P</b> | <b>Decision</b> |
|-----------|----------|-----------------------------|-----------|-----------|----------|----------|-----------------|
| Post-test | 5        | 3.26                        | 0.30      | 8         | 5.52     | 0.00     | S*              |
| Pre-test  | 5        | 2.53                        | 0.32      |           |          |          |                 |

Key:  $\bar{x}$  = Mean response of poultry farmers and teachers as revealed by pre-test and post-test scores, SD = Standard Deviation, n = Number of respondents, df = Degree of Freedom, P = Probability value, 0.05 = Level of Significance, S = Significant

Data in Table 5 indicate that there is a significant difference ( $P < 0.05$ ) in the mean performance scores of poultry farmers over time when rated using the BPEG. The post-test scores were higher than the pre-test score. This difference in the performance of poultry farmers using the BPEG to evaluate them shows an improvement in their performance after training them using the BPEG. This further confirms the effectiveness of the BPEG.

### Findings of the Study

From the data analysis of the research questions and tests of hypotheses, the following findings emerged from the study:

1. All the 31 psychomotor skills developed in the study were considered as suitable for inclusion in the Broiler production Evaluation Guide (BPEG).
2. The developed BPEG has a high inter-rater reliability over time.
3. The pretest and post-test conducted on the poultry farmers revealed a significant difference in performance confirming the usefulness of the BPEG as an assessment and training guide.
4. There was no significant difference in the performance scores of both the urban and rural farmers as shown by the higher post-test score when the BPEG was used than the pre-test score when the BPEG was not used.

### Discussion of Findings

The data analysis of research question one showed that all 31 skill items developed were suitable for inclusion in the BPEG as the assessment instrument for profitable broiler production. This finding is in consonance with Telbert, *et al.*, (2022) who asserted that it is essential that younger generation be equipped with necessary knowledge and skills to engage in agricultural practices and agribusiness effectively. Also, this finding is in line with Amadi (2017) that the primary objective of agricultural education is to inculcate in student's knowledge and train them for profession in agriculture. Furthermore, the finding agrees with Moses, Medugu, Mohammed and Wafudu (2017) who stated that assessment of psychomotor skills can be carried out by evaluation of the chronological process in which the task is carried out. The data analysis of the second research question shows very high reliability of the BPEG. This psychometric quality agrees with Frenkel, Wallen, and Hyun (2012) that a reliable test or evaluation instrument gives consistent results upon repeated measurement on the same individual. The finding is also analogous to Adamu, Dawha and Kamar (2015) and Nworgu (2006) that asserted that for the developed instrument to worth its salt, it must possess psychometric properties as validity and reliability to indicate the quality and usefulness.

Data analysis of research question three showed that the three raters showed consistent agreement among themselves in terms of how they rated the practicing farmers in their broiler production business. By implication, the processes the farmers who are the masters of the occupation followed were in agreement and the three raters themselves did not significantly differ in their judgment in the 31-item BPEG based on the kappa value of 0.5 or above. This is in line with Olorokor and Otu (2018) that the mode of evaluation employed by the school to

determine the proficiency of learners in a course of study as education for work would be promoted if a technoguide is used in evaluating students' level of performance in vocational and technological studies

### Conclusion

Data analysis in this study indicate that the Broiler Production Evaluation Guide (BPEG) is a reliable and valid instrument that can be used to inculcate psychomotor skills in poultry farmers and students, a reliable guide to the teacher/instructor and a rating scale for product and process evaluation. The psychomotor skill items as identified in this study can make students become "agripreneurs" if taken through the guide. The evaluation instrument that emerged from this study can measure what it is supposed to measure and also show moderate inter-rater agreement if different raters use it at different times to rate their clients in broiler chicken production.

### Recommendations

As a way forward in promoting vocational education, the following recommendations were made: Senior Secondary Schools should adopt the Broiler Production Evaluation Guide (BPEG) developed and validated using masters of the occupation in this study in training the students for broiler chickens production.

1. Examination bodies such as West African Examinations Council (WAEC) National Examination Council (NECO), National Business and Technical Board (NABTEB) should adopt the BPEG for rating students' practical work.
2. Education Administrators should make it a policy that Senior Secondary Students should be passed through the techno-guide that emerged from this study so as to realize the noble objective of education for work.

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