

## Development of Cognitive Learning Scale to Test the Knowledge of Poultry Farmers

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### Abstract

Three hundred and thirty six items were initially constructed on the basis of promoting thinking rather than rote memorization and differentiated the well informed poultry farmers from the poorly informed ones. The scores from sample respondents were subjected to item analysis, comprising of item difficulty index and item discrimination index. In the final selection, the scale consisted of 39 items with difficulty index ranging from 30 to 80 and discrimination index ranging from 0.30 to 0.55. The reliability of the knowledge test developed was tested by split-half and test-retest method. The co-efficient of correlation values in split-half and test-retest method were 0.88 and 0.85, respectively which were found to be significant at 1% level of significance. It was found that knowledge test constructed was highly stable and dependable for measurement.

### 1. Introduction

For the poorest of the poor and the landless, the major issues are food security and risk spreading through subsidiary income, which are not addressed by the private commercial sector. It is well known fact that a fairly significant proportion of the landless and marginal farmers eke out their living from poultry and other small ruminants. In India, rural poultry represents a significant part of the rural economy in particular and national economy in general. Besides the provision of employment and easily disposable income for small-scale farmers, particularly for rural women, poultry farming integrates very well into other household activities as it requires relatively little time and investment. Besides income generation, rural backyard poultry provides nutrition supplementation in the form of valuable animal protein and empowers women. If feeding, breeding and other managerial practices are properly followed, it would be possible to get the optimum level of production. And adoption of optimum managerial practices depends upon the knowledge level of the farmers understanding of which is essential to bring improvement in the cognitive domain of their behavior. In the present context the term 'knowledge' was conceptualized as the 'understood information'. With

this background a knowledge test was developed to assess the knowledge level of the poultry farmers.

### 2. Materials and Methods

#### 2.1. Item collection

The content of the knowledge test was composed of questions called 'items'. Items were collected from different sources, such as literature, field extension personnel, subject matter specialists in poultry production and the researcher's own experience. The questions were designed to test the knowledge level of poultry farmers about poultry farming.

#### 2.2. Initial selection of items

Items were selected on the basis of following criteria:

- Should promote thinking rather than rote memorization
- Should differentiate the well informed poultry farmers from the poorly informed, and should have certain difficulty value.

Based on the above criteria, 336 items were initially constructed in dichotomous format. Items were selected following Lindquist (1951), Jaiswal (1965), Moulik (1965), Sagar (1970), Dhargupta et al. (2008), and Mande et al. (2008).



### 3. Results and Discussion

#### 3.1. Preliminary administration of test

Items were pre-tested and modified by administering to 120 randomly selected poultry farmers. Score was given as '1' for 'right' and '0' for 'wrong' answer for each of the 336 items. The total of correct answer was the knowledge score secured by a farmer. The farmers were then divided into 6 groups ( $G_1$  to  $G_6$ ) each having 20 farmers. The farmers in each group were arranged in descending order as per the scores obtained by them. Only four extreme groups with high and low scores were considered for computation of item difficulty and item discrimination indices.

#### 3.2. Item analysis

Guilford (1954) pointed out that item analysis of a test usually yields two kinds of information. It provides an index of item difficulty and an index of item discrimination. The item difficulty tells us how difficult an item is, whereas, the index of item discrimination indicates how well the item measures or discriminates in agreement with the rest of the scale or how well it predicts some external criterion.

#### 3.3. Item difficulty index ( $P_i$ )

The difficulty index of an item was defined as the proportions of respondents giving correct answers to that particular item. This was calculated by the formula:

$$P_i = n_i / N_i \times 100$$

Where,  $P_i$  = Difficulty index of  $i^{\text{th}}$  item in percentage

$n_i$  = Number of respondents giving correct answers to  $i^{\text{th}}$  item

$N_i$  = Total number of livestock owners to whom  $i^{\text{th}}$  item was administered

#### 3.4. Item discrimination index ( $E1/3$ )

The discrimination index was obtained by calculating the Phi-co-efficient as formulated by Perry and Michael (1951). However, Mehta (1958) in using  $E1/3$  method to find out item discrimination emphasized that this method was analogous to, and hence, a convenient substitute for the Phi-co-efficient.

$$E1/3 = \frac{(S_1 + S_2) - (S_5 + S_6)}{\bar{N}/3}$$

The method suggested by Mehta (1958) was adopted for the study. The formula by which the item discrimination index was calculated is given below:

Where,  $S_1, S_2, S_5$  and  $S_6$  were the frequencies of correct answers in  $G_1, G_2, G_5$  and  $G_6$  groups, respectively and

$N$  = Total number of livestock owners in the sample of the item analysis.

#### 3.5. Selection of items for test

Two criteria, viz. item difficulty and item discrimination index were considered for selection of items in the final format of the knowledge test. In the present study, items with difficulty index ranging from 30 to 80 and discrimination index ranging from 0.30 to 0.55 were included in the final knowledge test. Item difficulty index and item discrimination index of all the 336 items were calculated and 39 items which fulfilled both the criteria were selected for the final format (Table 1)

#### 3.6. Scoring method

The summing up of scores for correct replies over all the items of a particular respondent indicated his level of knowledge about poultry farming. The range of scores was, therefore, from 0 to 39.

#### 3.7. Reliability

The reliability of the knowledge test developed was tested in the following two ways

##### 3.7.1. Split-half method

All the 39 items of the knowledge test were first arranged randomly and then divided into two halves. These two sets one having 18 items (even numbered) and the other having 19 items (odd numbered), were administered to 50 respondents separately. The co-efficient of correlation between two sets of scores was computed and the  $r$  value of 0.88 was found to be significant at 1% level of significance. The reliability co-efficient, thus obtained, indicated that the 'internal consistency' of the knowledge test developed for the study was quite high.

##### 3.7.2. Test-retest method

The knowledge test with 39 items was administered to 30 poultry farmers twice at an interval of 15 days. The co-efficient of correlation value was 0.85 which was found to be significant

Table 1: Knowledge test scale

Sl. No.	Item	Correct	Incorrect
1	Do you think that poultry farming is popular than duck farming?	Yes (1)	No (0)
Layer farming is very important because		Correct	Incorrect
2	It is a profitable business	1	0
3	It is a source of alternative income	1	0
4	It generates self employment	1	0

5	Initial investment is less	1	0
6	It provides nutrition	1	0
7	Excreta of poultry is good organic manure	1	0
8	Ready market is available	1	0
9	Poultry can be used in integrated farming	1	0
10	Poultry egg is consumed by many people	1	0
11	Broiler is more palatable than duck meat	1	0
12	Easy for hatching eggs	1	0
13	What is the average body weight of adult RIR cock?	3.5-4 kg (1)	Any other (0)
14	Nest box is used for laying eggs	Yes (1)	Any other (0)
15	How much drinking water is required for an adult bird?	250 ml (1)	Any other (0)
16	If fiber is more in poultry feed, what will happen?	Bird will consume more water (1)	Any other (0)
17	How long poultry birds should be kept for effective laying?	72 weeks (1)	Any other (0)
18	When layer starts laying?	After 20 weeks (1)	Any other (0)
19	What should be the floor space for an adult layer?	2 ft <sup>2</sup> (1)	Any other (0)
20	When broiler bird can be marketed?	6-7 weeks (1)	Any other (0)
21	What is the effect of ammonia gas in poultry?	Decrease production (1)	Any other (0)
Characteristic features of good layer		Correct	Incorrect
22	Soft and loose skin	1	0
23	Pelvic bone soft and wide gap	1	0
24	Keel bone wide gap	1	0
25	Parasites may affect the poultry birds	Yes (1)	No (0)
26	Infection spreads among poultry birds by air	Yes (1)	No (0)
27	Infection spreads among poultry birds by affected bird	Yes (1)	No (0)
Symptoms of ailing poultry birds		Correct	Incorrect
28	Drowsiness	1	0
29	Birds stay alone	1	0
30	Irregular arrangement of feathers	1	0
31	What is the organism responsible for pullorum disease in poultry?	Bacteria (1)	Any other (0)
32	Which age group is mostly affected by pullorum?	3 weeks (1)	Any other (0)
33	What type of Fowl cholera disease is?	Bacterial (1)	Any other (0)
34	Is fowl typhoid bacterial disease of poultry?	Yes (1)	No (0)
35	Do you know that tape worm is found in poultry?	Yes (1)	No (0)
36	Dewormer should be used to reduce internal parasitic load	Yes (1)	No (0)
37	When first Ranikhet vaccine should be given to broiler?	4-5 days (1)	Any other (0)
38	Vaccine should be preserved at 4°C	Yes (1)	No (0)
39	Different age groups may be reared at a time	Yes (1)	No (0)

at 1% level. Hence, the knowledge test constructed was highly stable and dependable for measurement.

### 3.8. Content validity of the knowledge test

In the final selection of the items, care was taken to include items covering the entire universe of relevant behavioral

aspects of the respondent with respect to knowledge about poultry farming. Items were collected through various sources including specialists and hence it was assumed that the scores obtained by administering this test measured knowledge of the respondents as intended.

#### 4. Conclusion

Knowledge of improved poultry farming practices is essential for entrepreneurship development. It is also vital for assessment and formulation of need based planning for the socio-economic development of the poultry farmers. But there is no such standard process for testing the knowledge level of rural poultry farmers. With this background a knowledge test scale was developed to assess the knowledge level of the rural poultry farmers. It was found that knowledge test constructed was highly stable and dependable for measurement of the knowledge level of the rural poultry farmers.

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