

Development of Cognitive Learning Scale to Test the Knowledge of Duck Farmers about Duck Farming

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Abstract

Two hundred and sixty two items were initially constructed on the basis of promoting thinking rather than rote memorization and differentiate the well informed duck 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 58 items with difficulty index ranging from 0.30 to 0.55 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 0.90 and 0.86 respectively which were found to be significant at 1 percent level of significance. It was found that knowledge test constructed was highly stable and dependable for measurement.

Key words : Duck farmer, Item analysis, Knowledge, Learning scale, Reliability.

Duck farming in India mostly consists of backyard or subsistence type of rearing. Duck farming in India mostly consist of large number of small farms and very few intensive commercial farms. Traditionally, the duck industry in the south-east Asian region was mainly a backyard activity. Ducks were mainly raised by small farmers to supplement the family income, similar to the rearing of indigenous chickens. The ducklings were hatched by traditional methods of incubation using charcoal or by individual brooding. Most of these ducks were raised in paddy field areas, near lakes, used tin-mine ponds, canals, streams or along coastal areas, because supplementary feed came from leftover rice bran and broken rice after harvesting season and shrimps, snails or cheap thrash fish. Sea-shells were also used as a cheap source of calcium. Though the duck industry has advanced much since late 1950s, the progress is not as rapid as the progress in chicken industry. To enhance and exploit the production potential of the duck breeds over the entire world is to introduce duck farming technologies for mass adoption and to create the necessary facilities vital for adoption of improved practices in duck farming. To bring improvement in the cognitive domain of the duck farmer's behavior, it is essential to know about their existing knowledge levels about the improved duck farming practices. For adop-

tion of recommended improved technologies it is prerequisite on the part of adopters that they possess good knowledge about these technologies and practices. In the present context the term knowledge was conceptualized as the understood information about recommended duck farming practices possessed by the duck farmers. With this background a knowledge test was developed to assess the knowledge level of the duck farmers.

Methods

Item Collection

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

Initial Selection of Items

The selection of items was done on the basis of the following criteria : It should promote thinking rather than rote memorization, and It should differentiate the well informed duck farmers from the poorly

informed ones and should have certain difficulty value. The procedure followed in selection of the test items was on the lines used by Lindquist (1), Jaiswal (2), Moulik (3), Sagar (4) and Dhargupta (5). Based on these two criteria, 262 items were initially constructed in dichotomous format.

Results and Discussion

Preliminary Administration of Test

The items were checked and modified on the basis of pre-testing (<http://www.cemca.org/books/Appendix%201.pdf>) and administered to 120 randomly selected duck farmers for item analysis. Each one of the 120 respondents, was given score 1 or 0 for each item according to whether the answer was right or wrong. The total number of correct answer given by a duck farmer out of 262 items was the knowledge score secured by him/her. After calculating the scores obtained from 120 duck farmers, the scores were arranged in descending order. These 120 duck farmers were then divided into six equal groups ($G_1 \dots G_6$) each having 20 duck farmers. Duck farmers in each group were arranged in descending order according to the total score obtained by each one of them. Only four extreme groups with high and low scores were considered for computation of item difficulty and item discrimination indices.

Item Analysis

Guilford (6) pointed out that item analysis (<http://chiron.valdosta.edu/mawhatley/3900/itemanalysis.pdf>) 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.

Item Difficulty Index (P)

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

$$P_i = \frac{n_i}{N_i} \times 100$$

Where, P_i = Difficulty index in percentage of i th item, N_i = Number of duck farmers giving correct answers to i th item, n_i = Total number of duck farmers to whom i th item was administered.

Item Discrimination Index ($E^{1/3}$)

The discrimination index was obtained by calculating the Phi-coefficient as formulated by Perry and Michael (7). However, Mehta (8) in using $E^{1/3}$ method to find out item discrimination emphasized that this method was analogous to, and hence, a convenient substitute for the Phi-co-efficient. The method suggested by Mehta (8) was adopted for the study. The formula by which the item discrimination index was calculated is given below :

$$E^{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}$$

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 duck farmers in the sample of the item analysis.

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 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 262 items were calculated and fifty eight items which fulfilled both the criteria were selected for the final format of the knowledge test (Table 1).

Scoring Method

The summing up of scores for correct replies over all the items of a particular respondent indicated his level of knowledge about duck farming. The range of scores was, therefore, from 0 to 58.

Table 1. Scale to test the knowledge level about duck farming.

Item		Correct	Incorrect
1	Do you believe that duck farming is the substitute of poultry farming ?	Yes No	1 0
Duck farming is very important because :		Correct	Incorrect
2	Egg wt. is 15-20 g more than poultry	1	0
3	Only kitchen wastes are sufficient for feeding	0	1
4	No need of big pond for improved breed of duck	1	0
5	Duck can be reared for both meat and egg	1	0
6	Duck can lay eggs for 2-3 yrs	1	0
7	Duck lays eggs within 9 am for which it is easy to collect without loss or extra labor	1	0
8	Ready market is available	1	0
9	Duck excreta are good organic manure	1	0
10	What is Khaki Campbell (KC) ?	Improved breed of duck Any other	1 0
11	Whether KC is meant for egg or not ?	Yes (egg) Any other	1 0
12	IS KC layer breed ?	Yes No	1 0
13	Wheat is the average wt of one duck egg ?	65—70 g Any other	1 0
14	After how many days ducklings will be full feathered ?	12 wks Any other	1 0
15	Housing of duck is essential for night shelter	Yes No	1 0
Duck house should be constructed as follows :		Correct	Incorrect
16	It should be airy	1	0
17	Easy drainage system	1	0
18	Well lighted	1	0
19	Should not be on low land	1	0
20	Protected from snakes, rats, rodents	1	0
21	Floor should be dry	1	0
22	Is brooder rearing found in duck farming ?	Yes No	1 0
23	Due to which gas ducklings may be died in brooder house because of use of kerosine lamp	Co & Co ₂ Any other	1 0
24	Grower duck can be reared in pond water	Yes No	1 0
25	Grower duck can be reared in deep liter with run	Yes No	1 0
How would you differentiate duck from drake in duckling stage ?		Correct	Incorrect
26	Duck produce sound of low tone	1	0
27	Tail feather of drake is curled and raised upwards	1	0
28	Vent of day old drake is more bluish	1	0
29	If you press rectum with thumb and index finger, small penis will come out in case of drake	1	0
Integrated duck cum fish farming is encouraging because :		Correct	Incorrect
30	More exercise in fish	1	0
31	Fish provides hygienic environment for ducks in pond	1	0

Table 1. Continued.

	Item	Correct	Incorrect
32	By taking insects, snails duck provides good environment for fish in pond	1	0
33	Brooding temperature is to be maintained in brooding house	Yes No	1 0
34	First 2-3 days soft and wet feed may be provided to ducklings in brooding house	Yes No	1 0
35	What should be the ratio of female and male in laying duck	5—6 : 1 Any other	1 0
36	In which age male duck should be used for breeding ?	1.5 yr Any other	1 0
37	What is fertile egg ?	From which chicks born Any other	1 0
38	How many eggs can be hatched at a time by one duck ?	10—12 Any other	1 0
39	Paralysis of leg and wing is one of the symptoms of ailing duck	Yes No	1 0
40	Birds are affected due to parasites	Yes No	1 0
41	Infection can spread for duck by feed	Yes No	1 0
42	Infection can spread for duck by egg	Yes No	1 0
43	Infection can spread for duck by rats, rodents, mice	Yes No	1 0
44	What is the organism responsible for duck plague ?	Viral Any other	1 0
45	In duck plague penis comes out in case of dead drake	Yes No	1 0
46	Do you give vaccine to the affected birds ?	Yes No	1 0
47	In duck plague 1st dose of vaccination should be at 2 weeks	Yes No	1 0
48	Glucose water should be provided to drink for prevention of feed toxicity in duck	Yes No	1 0
49	When will you provide dewormer to duck ?	2 month interval Any other	1 0
50	All vaccines should be preserved at 4 C	Yes No	1 0
51	Supplementation of vaccination gives good results	Yes No	1 0
52	Instructions printed on the vaccine vial should be followed strictly	Yes No	1 0
53	Disease free and healthy duckling should be purchased from authorized & dependable	Yes No	1 0
54	Sanitary measures have to be followed to save duck from diseases	Yes No	1 0
55	Ducklings should not be reared in a crowd	Yes No	1 0
56	Good quality balanced diet should be provided	Yes No	1 0
57	Liver extracts and vitamins may be given before deworming	Yes No	1 0
58	Registered doctors have to be consulted in needs	Yes No	1 0

Reliability

The reliability of the knowledge test developed was tested in two ways (<http://www.cemca.org/books/Appendix%201.pdf>).

Split-Half Method. All the 58 items of the knowledge test were first arranged randomly and then divided into two halves. These two sets having twenty nine items were administered to 50 respondents separately. The co-efficient of correlation between two sets of scores was computed and the *r* value of 0.90 was found to be significant at 1% level of significance. The reliability coefficient, thus obtained, indicated that the “Internal consistency” (<http://writing.colostate.edu/guides/research/relval/com2a4.cfm>) of the knowledge test developed for the study was quite high.

Test-Retest Method

The knowledge test with 58 items was administered to 30 duck farmers, twice at an interval of 15 days. The coefficient of correlation value was 0.86 which was found to be significant at 1% level. Hence, the knowledge test constructed was highly stable and dependable for measurement.

Content Validity of the Knowledge Test

Care was taken to include items covering the entire universe of relevant behavioral aspects of the respondent with respect to knowledge about duck 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 (<http://writing.colostate.edu/guides/research/relval/com2b5.cfm>).

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