Research Article

Development of cognitive learning scale to test knowledge of Dairy farmers on Dairy farming Practices

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Abstract

The knowledge test was developed to measure the knowledge of dairy farmers. In all 125 items were initially constructed on the basis of promoting thinking rather than root memorization and differentiate the well informed dairy farmers from the poorly informed ones. The scores from sample respondents were subjected to item analysis, comprising of item difficulty index & item discrimination index. In the final selection, the scale consisted of 50 items with difficulty index ranging from 30-80 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 coefficient of correlation values in split half & test retest methods were 0.85 & 0.76 respectively which were found to be significant at 1% level. It was found that knowledge test constructed was highly stable & dependable for measurement.

Keywords: Knowledge; Scale; Dairy farming; Cognitive; Development etc

Introduction

India ranks first in milk production, which is 14.6% of the world production. A total cattle population of India was 19.89 crores in which 16.58 crores (83.36%) belongs to indigenous variety with lower productivity due to ignorant scientific farming practices. To sustain and reachdesired level of milk production and improvement in the cognitive domain of dairy farmer's behavior it is crucial to know about their existing knowledge level about improved dairy farming practices. For adoption of recommended practices it is prerequisite that the adopter must possess good knowledge about these practices. In the present study, the term knowledge was conceptualized as the understood information about recommended dairy farming practices possessed by the dairy owners. A knowledge test has been defined by Bloom., *et al.* (1995) as a test which refers to those behaviors and test situations which emphasizes remembering by the recall of ideas, material or phenomenon. Considering this fact, a cognitive knowledge test scale was developed to assess the knowledge of dairy farmers.

Materials and Methods

Item collection: The content of knowledge test was composed of questions called items. Items for the test were compiled from different sources, such as literature, field extension personnel, subject matter specialists in animal and dairy sciences and the researcher's own experiences. The questions were designed to test the knowledge level of Dairy owners about dairy farming practices.

Initial selection of items: The selection of items was done on the basis of the following criteria:

(i) It should promote thinking rather than rote-memorization, and (ii) It should differentiate the well-informed Dairy owners from the poorly informed ones and have a certain difficulty value.Based on these two criteria 125 items were initially collected for construction of the knowledge test were in objectives form and were in dichotomous or multiple choice format. A schedule was prepared with these 125 items for administering to the livestock owners for item analysis and screen out further items.The procedure followed in selection of the test items was on the lines used by Jaiswal (1965), Sagar (1983), Dhragupta (2008) etc.

Results & Discussion

Preliminary administration of test: Items were pretested and modified by administering to 90 randomly selected dairy owners. Score was given as '1' for right and 0 for wrong answer for each of the 125 items. The total 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 15 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.

Item analysis: Guilford explored that the item analysis of a test yields two kinds of information: item difficulty and item discrimination. The index of item difficulty revealed how difficult an item was whereas the index of discrimination indicated the extent to which an item discriminates to well inform individuals from the poorly informed ones.

Item difficulty index (Pi): The difficulty index of an item was defined as the proportions of livestock owners giving correct answers to that particular item. This was calculated by the formula:

$$Pi = ni/Ni \times 100$$

Where, Pi = Difficulty index in percentage of ith item.

ni = Number of Dairy owners giving correct answer to i^{th} item.
Ni = Total number of Dairy owners to whom ith item was administered.

Item discrimination index: The discrimination index was obtained by calculating the Phi-Coefficient 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-Coefficient. The method suggested by Mehta (1958) was adopted for the present 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 item analysis.

Selection of items for test: Two criteria viz. item difficulty index 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 format of the knowledge test. Item difficulty index and item discrimination index of all the 125 items were calculated and 50 items which fulfilled both the criteria were selected for the final format of knowledge test in Table-1. The study was similar with the study of Meena., *et al.* (2007) & Goswami (2012).

Scoring method: The summation of scores for correct replies over all the items of a particular respondent indicated his/her level of knowledge about the practices mentioned above. The range of scores was, therefore, from 0 to 50.

SL.No.	ITEMS(STATEMENTS)	ANSWERS	DI Index	Disc. Index
1	Which Indian Dairy Breed is ideal for milk production?	a) Sahiwal-Red Sindhi-(1) b) Any other-(0)	65.56	0.30*
2.	What should be the minimum body wt. of dairy animals during puberty?	a) 250-300 Kg-(1) b) Any other-(0)	63.33	0.30*
3.	What is the initial breeding age of a improved dairy animals?	a)18-24 months –(1) b) Any other-(0)	58.89	0.37*
4.	What is average gestation period of a dairy animal?	a) 280 ± 5 days-(1) b) Any other-(0)	67.78	0.33*
5.	In which heat cycle a heifer should be inseminated for first time?	a) Second-(1) b) Any other-(0)	65.56	0.37*
6.	What is the cause of anoestrus in cow even after attaining puberty? Malnutrition-(1)		67.78	0.33*
7.	Reproductive hormonal disorder-(1)		70.00	0.37*

8.	Heavy parasitic load-(1)		67.78	0.30*
9.	All of the above-(1)		64.44	0.33*
10.	How many days after parturition should a crossbreed cow are inseminated?	a) 45-60 days-(1) b) Any other-(0)	73.33	0.37*
11.	When the animal is to be inseminated for successful ovulation?	a) 10-12 hrs after heat(1) b) Any time (0)	53.33	0.30*
12.	When animal is to be examined for pregnancy after AI?	a) 3 months after -(1) b) No Need-(0)	53.33	0.30*
13.	What is the best method to improve milk production in Deshi cattle?	a) Cross breeding by AI-(1) b) Any other-(0)	61.11	0.30*
14.	What is the ideal lactation period of a dairy animal?	a) 300-305 days-(1) b) Any other-(0)	72.22	0.33*
15.	What is the avg. oestrous period of dairy animals?	a) 18-21 days –(1) b) Any other-(0)	67.78	0.43*
What is the principal feed resource of Dairy animal? 16. Dry & green roughage (1)			68.89	0.40*
17.	Concentrate fed –(1)	66.67	0.40*	
18.	Green fodder-(1)	77.78	0.37*	
19.	All of the above-(1)	64.44	0.30*	
20.	How much concentrate feed to be fed a milch animal for every Kg milk production?	a) 2-2.5 Kg-(1) b) Any other-(0)	66.67	0.37*
21.	How much quantity of extraconcentrate to be fed an advanced pregnant animal?	a) 1-1.5 Kg-(1) b) Any other-(0)	64.44	0.33*
22.	What is the quantity of green fodder to be fed in dairy animal's pert day?	a) 30-40 Kg-(1) b) Any other-(0)	76.67	0.37*
23.	How much cereals are required to make concentrate feed for dairy animals?	a) 25-35% -(1) b) Any other-(0)	77.78	0.47*
24.	How much oil cake is needed to compute dairy animals concentrate feed?	a) 25-35%-(1) b) Any other-(0)	61.11	0.30*
25.	What is the proper quantity of concentrate mix to be fed dairy animal/day?	a) 1.5+50% of milk yield-(1) b) Any other-(0)	82.22	0.33*
26.	What is the alternative protein substitute used in dairy animals feeding?	a) Urea straw feeding-(1) b) Any other-(0)	65.56	0.30*
27.	In what stage Green fodder is to be cut for feeding of dairy animals?	a) Before flowring(1) b) Any other-(0)	71.11	0.47*
28.	How can you improve milk production of dairy animals? a) Feeding of GF & concentrate mix-(1) b) Any other-(0)		74.44	0.37*
29.	Feeding of milk to Dairy Calf should be continued up to?	a) 2-3 months-(1) b) Any other-0)	63.33	0.33*
30.	Which system of housing is ideal in scientific dairy farming?	a) Semi-Intensive-(1) b) Any other-(0)	65.56	0.30*
31.	What is the minimum space required for adult dairy animals	a) 50-60 Sqft-(1) b) Any other-(0)	54.44	0.37*
32.	Why Colostrum should be provided to new born calf after birth?	a) Develop immunity(1) b) Any other-(0)	71.11	0.33*
33.	How much quantity of colostrum to be fed to	a) 10% of B. Wt.-(1)	55.56	0.30*

	new born?	b) Any other-(0)		
34.	What is the ideal dry period of dairy animal for better production in next lactation?	a) 60-70 days-(1) b) Any other-(0)	68.89	0.30*
35.	What is the proper involution period of a dairy animal after calving?	a) 45-60 days –(1) b) Any other-(0)	53.33	0.30*
What is the most infectious disease in dairy animals?			67.78	0.33*
37. HS-BQ-(1)			62.22	0.30*
38. All of the above-(1)			54.44	0.33*
What is the deworming schedule in dairy animals?			66.67	0.33*
39. Monthly interval up to 06M-(1) 40.Quarterly after 06 month 41. all of the above- (1)			65.56	0.30*
42.	How can you control internal parasite of dairy animals?	a) Deworm regularly (1) b) Any other-(0)	65.56	0.33*
43.	Why vaccination is done in dairy animals?	a) Prophylactic mea-sures-(1) b) Any other-(0)	63.33	0.43*
What is the schedule of FMD vaccine in Dairy animal?		44. 1st at 2 month age-(1)	57.78	0.30*
45. 2nd Booster Dose after 21 days – (1)			71.11	0.37*
46. Next repeat half yearly interval-(1)			60.00	0.30*
What is the schedule of HS-BQ vaccine in Dairy animal? 47. 1st at 2 Mo age-(1)			62.22	0.30*
48. Next repeat yearly interval-(1)			52.22	0.47*
49.	Which disease causes maximum mortality in neonatal calf	a) Calf scour-(1) b) Any other-(0)	80.00	0.37*
50.	How can you efficiently control Ecto-parasite in Dairy animals?	a) Use of Ecto-Parasiti-cide-(1) b) Any other-(0)	75.56	0.33*

Table 1: Final scale for Knowledge test in Dairy Farming Practice along with their Difficulty Index & Discrimination Index.

Reliability: The reliability of knowledge test developed was tested in following two ways.

a. Split-Half method: All the 50 items of knowledge test were first arranged randomly (simple random sampling) and then divided into two parts. In these two sets, one set having 25 items with odd numbers and other set having 25 items with even numbers were administered to 50 respondents separately. The co-efficient of Co-relation between two sets of scores was computed and the value 0.764 was found to be significant at 1% level. The reliability co-efficient, thus obtained, indicated that the internal consis-tency of the knowledge test developed for the study was quite high.

b. Test-Retest method: The knowledge test with 50 items was administered to 30 Dairy owners, twice at an internal of 15 days. The co-efficient of co-relation value was 0.854, which was found to be significant at 1% level. Hence, the knowledge test constructed was highly stable and dependable for measurement of this variable.

Content validity of knowledge Test: In the final selection of items, care was taken to include items covering the entire universe of rele-vant behavioral aspects of the respondents with respect to knowledge about Dairy farming practices in relation milk production. Items were collected through various sources including specialists and hence it was assumed that the scores obtained by administrating this test – measured knowledge of the respondents as intended.

Conclusion

Knowledge of scientific dairy farming practices is essential for en-trepreneurship development. It is also crucial for assessment and for-mulation of need based planning for the socio economic development of dairy farmers. But there is no such standard process for testing the

knowledge level of rural dairy farmers. With this background a knowledge test scale was developed to assess the knowledge level of the rural dairy farmers. It was found that knowledge test constructed was highly stable and dependable for measurement of the knowledge level of the rural dairy farmers.

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