Designing of Scale to Measure the Attitude of ARS Trainees towards FOCARS Programme of NAARM

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ABSTRACT

The psychological object for the present study has been conceptualized as different components of a training programme. The attitude of the respondents towards FOCARS (Foundation Course for Agricultural Research Services). The FOCARS is designed for the newly recruited entry level scientists to the Agricultural Research Service of the ICAR. The extent of effectivenesss of the programme is depends on the attitude change of the trainees. To measure the attitude of the trainees a standardised scale was essential. Hence, it was felt necessary to construct a comprehensive, valid and reliable scale for studying the attitude of trainees towards FOCARS programme. Method of equal appearing intervals developed by Thurstone and Chave (1929) was used. Finally sixty statements were selected after the editing based on Edwards criteria. The statements were then subjected for judging to 40 experts. Each subject was asked to judge the degree of more favorableness or more unfavorableness of feeling expressed by each statement in terms of the 11 intervals. Finally, 26 statements were selected from statements for which scale (S) and Q values were worked out. The scale values of the statements on the psychological continuum were relatively equally spaced.

Attitude is commonly considered to be a mental state of readiness and preparedness organised through experience which exerts dynamic and positive influence upon an individual to respond in a particular way. Psychological object may be any symbol, phrase, slogan, person, institution, idea or ideal towards which people can differ with respect to positive or negative affect.

The cognitive component of an attitude consists of the beliefs, which involves attributes like favorable or unfavorable, desirable or undesirable, good or bad etc. The feeling component refers to the emotions i.e. likes or dislikes, pleasing or displeasing etc. which give attitude a motivating character or action tendencies. It is actually a physical manifestation. The action tendency component of an attitude includes all behavioral readiness associated with it. These three components of attitude are, however, consistently related to each other.

The psychological object for the present study has been conceptualized as different components of a training programme. The attitude of the respondents towards FOCARS (Foundation Course for Agricultural Research Services). The FOCARS is designed for the

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newly recruited entry level scientists to the Agricultural Research Service of the ICAR. The course aims at providing exposure to the trainees on the concepts and principles of project management with special emphasis on project formulation and implementation. It also includes capsules in related areas on human resources development, and information and communication management.

The main objective of the programme to appraise the scientist trainees about agricultural scenario, and the agricultural research, education and development systems in the country and to sensitize the scientist trainees about the global agricultural scenario and its implications to Indian agriculture. To stimulate critical thinking and multidisciplinary approach to agricultural research. Training programme was measured by the attitude scale especially constructed to meet the objectives. Attitude in the present study as defined by Thurstone (1996) is "the degree of positive or negative affect associated with some psychological object". FOCARS training programme was taken as a psychological object towards which trainees could differ with respect to positive or negative effect.

Thurstone's equal appearing interval techniques was used to construct the attitude scale because the technique has an absolute system of units and also show higher reliability. The steps used in construction of attitude scale are as follows :

METHODOLOGY

i.Collection and Editing of Items

Method of equal-appearing intervals, by Thurstone and Chave (1929) was used. A total of 100 statements were selected which varied in degree of more favorableness or more unfavorableness as expressed by each statement. Sixty attitude statements about FOCARS training programme were collected initially. These statements were obtained from all possible sources e.g. literature, discussion with experts, experience of investigator and trainees. The statements thus collected were edited for final selection on the basis of the criteria suggested by Edwards (1969). Finally, sixty statements were selected after the editing based on Edwards criteria. The statements were then subjected for judging to 40 experts. Each subject was asked to judge the degree of more favorableness or more unfavorableness of feeling expressed on each statement.

As mentioned in the methodology attitude scale was constructed and administered on respondents to determine their attitude towards FOCARS training programme

ii. Measurement of attitude: To determine the attitude of trainees towards FOCARS programme, an attitude scale was developed for the study using Thurstone's equal appearing interval technique or attitude scale construction. The scale consisted of five point continuum i.e. strongly agree, agree, undecided, disagree and strongly disagree with 5, 4, 3, 2 and 1 score respectively for favourable and 1, 2, 3, 4 and 5 scores

respectively for unfavourable statement. Scale was administered to the trainees and mean scores were worked out for all the respondents by adding scores for all the statements for an respondent and dividing at by the number of statements.

iii.Judges' rating of attitude statements: Cyclostyled copies of all the 60 statements together with 5 point continuum against each statement were personally given / mailed to 50 judges with a request letter explaining procedure of judgement. The, judges selected for the study comprised of extension specialists, trainers, scientists, sociologists, educationists and course directors (FOCARS). The judges were requested to sort out the statements on 5 point scale i.e. most favourable, favourable, neutral, unfavourable and most unfavourable statement in judging the attitude toward FOCARS training programme. They were also requested to delete redundant statements and suggest modifications in the scale they deemed necessary. Out of 50 judges, proforma was returned by 24 judges.

iv.Calculation of scale and Q values: The data obtained from a large number of judges was then arranged. Data obtained for each statement was arranged in three rows. Frequency was arranged in the first row the way in which the statement was placed in each of the 9 categories. The second gives these frequencies as proportions. The proportions are obtained by dividing each frequency by the total number of judges or, more simply, by multiplying each of the frequencies by the

median of the distribution of judgments for each statement was taken as the scale value of the statement; scale value was obtained by using the following formula.

On the basis of judges rating in equal appearing interval, the scale values of 60 statements were obtained by computing their medians. The semi-interquartile range 'Q' was computed as an index of dispersion of statements in the scale. The goal was to have smaller number of statements evenly placed on the continuum. The Q value indicated the ambiguity or uncertainty of the meaning of the statements. The statements with larger Q value were omitted. Since the median of the distribution of judgement for each statement is taken as the scale value of the statement, the scale value was calculated with the help of the following formula.

$$S = 1 + \frac{0.50 - \Sigma pb}{pw} \, i$$

Where   S = the medium or scale value of the statement.

l = the lower limit of the interval in which the median falls,

pb = the sum of the proportions below the interval in which the medium falls.

pw = the proportion within the interval in which the median falls.

i = the width of the interval and is assumed to be equal to 1.0.

To determine the Q value, two other point

measures i.e. the 75th and 25th centile were calculated using the following formulae:

$$C_{25} = 1 + \frac{0.25 - \Sigma pb}{pw} \, i$$

$$C_{25} = 1 + \frac{0.75 - \Sigma pb}{pw} \, i$$

Where, C25 and C75 = the 25th and 75th centile respectively.

I = the lower limit of the interval in which the 25th or 75th centile falls.

pb = the sum of the proportion below the interval in which the 25th or 75th centile falls.

Interquartile range (Q) was used as measure of variation of the distribution of judgments for a particular statement. To determine the value of Q 75th and 25th centiles were calculated. The 25th centile was obtained.

Then the interquartile range or Q value was obtained by taking the difference between C75 and C25. Thus

$$Q = C_{75} - C_{25}$$

The scale value and Q value for each of the 60 statements was thus calculated according to the above mentioned formula.

(iv) Final selection of the attitude statements

26 statements were selected from 60 statements for which we had scale and Q values in such a way that the scale values of the statements on the psychological continuum are relatively equally spaced and such that the Q values are relatively small. These statements were then arranged in random order and presented to subjects with instructions to indicate those that they are willing to accept or agree with and those that they reject or disagree with. Taking only the statements with which the subject has agreed, an attitude score was obtained from the scale values of these statements that were regarded as an indication of the location of the subject on the psychological continuum on which the statements have been scaled. The attitude score is based upon the arithmetic mean or median of the scale values of the statements agreed with.

When there was good agreement among the judges in judging the degree of favourableness or unfavourableness of a statement, Q value was small as compared with the value obtained when there was relatively little agreement among the judges. Based on the following criteria, 26 statements were finally selected for attitude scale Representation of the universe of the opinion about the programme.

The scale values should have equal appearing intervals and equal distribution of favourable and unfavourable attitude statements.

The scale values of the selected statements ranged from 1.95 to 4.65 and Q values from 0.77 to 3.16 with five class intervals. The scale and Q values of attitude statements are given in Table 1.

Table 1.
Selected Statements Attitude of the ARS Trainees towards Foundation
Course on Agricultural Research Service (FOCARS) conducted by NAARM

Sl.No.	Statements	S Value	Q Values	Selected/ Rejected for attitude scale
1	The training improved my confidence to work at institute	4.24	1.28	Rejected
2*	Training improved my decision making capacity *	4.12	1.12	Selected
3*	It helped me to work in a team/group*	4.33	1.12	Selected
4	It has no direct implications on professional accomplishments	3.05	1.94	Rejected
5	It helped to get self-motivation to accomplish my professional and organizational objectives	3.50	1.42	Rejected
6*	It has made me a good communicator*	2.36	1.45	Selected
7*	It helped to broaden my understanding of the National Agricultural Research Systems in the country and world*	2.95	2.01	Selected
8	There was no conformity between learning situation and working situation	3.95	2.39	Rejected
9	I got an opportunity to interact with young professionals of different disciplines and cultural background	3.12	2.72	Rejected
10	FOCARS offers to tackle unexpected problems with skill and confidence	3.19	3.16	Rejected
11*	FOCARS provided the opportunity to know office procedures*	3.44	2.18	Selected
12	FOCARS helped to understand diversity of culture norms, customs and values	4.28	1.29	Rejected
13	Foundation course is of no help for working in difficult situations	3.61	2.11	Rejected
14	FOCARS training helped me to work with persons of different cultural background	4.07	1.46	Rejected
15*	FOCARS is necessary for all entry level scientists*	4.96	1.23	Selected
16	FOCARS is the most credible source for capacity building of ARS Scientists	4.22	1.15	Rejected
17*	It is not appropriate means to acquire knowledge*	4.24	1.14	Selected
18*	It provides excellent chance to learn innovative concepts through practical experience*	3.85	1.67	Selected
19	Management skills are in born and training (like FOCARS) does not make any difference	4.31	1.18	Rejected
20	It facilitated the ARS scientists to improve their job performance by way of application of learned knowledge and skills in the job situation	3.84	1.06	Rejected
21	Practical sessions are not adequate during the programme to strengthen individual capabilities	4.36	1.46	Rejected
22*	Field visits planned during FOCARS are not adequate/appropriate to strengthen the individual capabilities*	3.11	2.49	Selected

Sl.No.	Statements	S Value	Q Values	Selected/ Rejected for attitude scale
23*	Exposure through Field Experience Training (FET) programme in rural areas is quite useful*	4.02	0.77	Selected
24*	Involvement of guest faculty is adequate*	4.64	1.02	Selected
25*	The ratio of practical sessions are not proportionate to lectures*	3.96	0.96	Selected
26*	During the FET programme application of PRA tools for rural appraisal and problem identification is useful for my research carrier*	3.22	2.64	Selected
27	Field Experience Training is repetition of what we have learned during UG programme at University	3.05	1.92	Rejected
28*	Project Management Techniques learnt during FOCARS are useful at back home situation*	2.98	1.12	Selected
29*	FOCARS training guided me in formulation of the research project and budgeting very well*	3.98	0.94	Selected
30*	Foundation course helped me in improvement of my presentation skill*	4.26	1.24	Selected
31	Training programme was useful for effective use of AV Aids*	4.24	1.06	Rejected
32*	FOCARS training is useful in knowing advanced photography and slide preparation (PPT)*	4.69	1.09	Selected
33*	Training exposed us how to write a scientific paper writings*	3.12	2.82	Selected
34	FOCARS training helps in instant socialization with fellow trainees	4.89	1.89	Rejected
35*	FOCARS training provides opportunities for holistic personality development including health management*	2.73	1.75	Selected
36*	FOCARS training provides exposure to understand the administrative and financial system of ICAR*	1.95	2.13	Selected
37	FOCARS training is useful to manage stressful condition	3.84	1.08	Rejected
38*	FOCARS provides necessary knowledge and skills for intellectual property protection and management*	2.02	1.94	Selected
39*	FOCARs facilitates effective use of library resources for research project management*	3.92	1.11	Selected
40	FOCARS has built-in content and exercises to improve oratorical skills	4.36	1.58	Rejected
41	FOCARS does not help in improving scientific writing skills	3.12	2.84	Rejected
42*	FOCARS gives a comprehensive understanding of National Agricultural Education and Extension Systems*	3.22	2.06	Selected
43	FOCARS training is biased towards social sciences	3.69	2.45	Rejected
44	FOCARS training provided me opportunities to understand the implications of emerging sciences like nanotechnology, biotechnology, geospatial technologies	4.32	1.34	Rejected
*45	The trained scientist can manage to overcome crisis situation on the job	3.96	2.86	Selected

Sl.No.	Statements	S Value	Q Values	Selected/ Rejected for attitude scale
*46	FOCARS-like training should be made compulsory for newly recruited teachers and extension professionals of agricultural university system	3.66	2.08	Selected
47	FOCARS training stimulated critical thinking and multidisciplinary approach to agricultural research	4.36	1.46	Rejected
48	The information technology related content of FOCARS is up-to-date and helped in improving my IT skills	3.24	2.47	Rejected
49	FOCARS provides confidence for writing convincing research proposals	4.36	1.86	Rejected
50	Opportunities for cultural and literary activities are limited during FOCARS	3.16	1.18	Rejected
51	The schedule of FOCARS is so tightly packed that it leaves no time for sports and physical exercises	3.84	1.06	Rejected
52	FOCARS is a well structured and managed programme	4.28	2.32	Rejected
53*	The most important contribution of FOCARS is developing fraternity among agricultural scientists*	4.65	1.14	Selected
54	FOCARS training does not offer opportunities to develop initiative and responsibility sharing	4.31	1.16	Rejected
55	FOCARS training is waste of time and resources as it does not help scientists to focus researchers on stakeholders' needs	3.12	2.82	Rejected
56	FOCARS has built-in measures to inculcate discipline, professional behavior and effective time management in young agricultural scientists	3.08	2.46	Rejected
57	Timing of different sessions are not appropriate	4.04	0.80	Rejected
58	The Boarding and lodging facilities are not adequate	4.64	1.25	Rejected
59	The duration of FET is not adequate	4.50	1.16	Rejected
60	NAARM has convenient capacity building and ambience	4.39	1.24	Rejected

(v) Scoring procedure and final format of the scale

Out of twenty six selected statements eleven statements were the indicators of favourable attitude towards the programme and remaining eleven statements were indicating unfavourable attitude. These finally selected twenty two statements were randomly arranged to avoid response bias. Against each of these statements, thus arranged, there were five columns representing a 5 point continuum as strongly agree, agree, undecided, disagree and strongly disagree with weightage of 5, 4, 3, 2 and 1 respectively for favourable statements and weightage of 1, 2, 3, 4 and 5 for unfavourable statements.

The scale was then administered to the 30 respondents and attitude score of each individual was calculated.

(vi) Reliability of attitude scale

According to Kerlinger (1967) "Reliability

is the accuracy or precision of measuring instrument". To know the reliability of the scale split half method was used.

The split half method

Total 26 statements in the scale were divided into two equal halves by putting the odd numbered items on one side and even numbered items on the other side. Both halves were considered as separate schedule with 13 statements each. Each set of half part of a schedule was administered on the same group of 30 respondents alternatively who were not included in the final sample. To find out the agreement between two sets of statements of the schedule, correlation coefficient was calculated and put to Spearman Brown prophecy formula as given here

$$r_{11} = \frac{2 \ (roe)}{1 + roe}$$

Where roe is the coefficient of reliability of two half test i.e. odd and even and r_{11} is the reliability coefficient of the entire test. Reliability coefficient for attitude scale was found to be 0.71. The scores for the subjects on the two forms were correlated and this correlation was taken as a measure of the reliability of the scales.

(vii) Validity of attitude scale

The validity of the test dependents upon the fidelity with which it measures what is expected to measure. In intrinsic validity of attitude scale was calculated by taking the square root of the reliability coefficient. The final scale was administered to 40 trainees for the validity of the scale. The value of test was found to be significant. The coefficient of validity was found to be 0.84. Also the content, logical, construct and concurrent validity of the scale was ensured through jury validation and properly selecting the statements to cover the whole universe of the content with the help of literature. The scale thus met the reliability and validity test satisfactorily and indicated, its ability as an instrument for measuring attitude of trainers towards FOCARS training programme.

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