



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(5): 555-558
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www.thepharmajournal.com
Received: 22-03-2022
Accepted: 24-04-2022

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Development of the scale for measuring the training needs of the extension personnel working for transfer of agricultural technology

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Abstract

Training consists largely of well organized opportunities for participants to acquire necessary understanding and skills. A study to develop the scale for measuring the extent of need of training courses as perceived by the extension personnel working for transfer of agricultural technology among the farmers. The method of summing rating suggested by Likert (1932) was found appropriate due to large number of items. A schedule of statements was sent to 65 judges to found its appropriateness by assigning the score on each item. The process started with selection of 93 statements and 59 statements were finally retained in the scale. Reliability of the scale was found to be 0.88. The validity of the scale was tested by experts' judgments. The reliability and validity of the scale indicates its consistency and precision of the results. Hence, the training need scale was found to be standardized.

Keywords: Training, training needs, scale, extension personnel

Introduction

It is a widely recognized fact that transfer of technology from research stations to farmers' field is essential for increasing the agricultural production as well as productivity. It implies that extension personnel working for transfer of agricultural technology should have profound knowledge of the subject and possess required skills for effective communication for educating and motivating farmers to adopt new technologies. To be effective, the extension personnel need to be acquainted with the knowledge of not only what is contained in the new technology, but also the various and effective methods, principles and strategies to communicate the various innovations in a meaningful.

The job training is the type of training given to an individual who is gainfully employed but requires certain knowledge and skills to improve his efficiency (Abhishek *et al.* 2013) [1]. Training need is a condition where there is a gap between what is and what should be in terms of incumbents' knowledge, skills, attitudes, and behaviour for a particular situation at one point in time. Thus, identification of training need is the first and most important task of the steps and processes that must be performed before the beginning of training. Hence, to measure the extent of need of training courses of the extension personnel is essential for designing the training programme. In this regard, an attempt was carried out to develop the scale to measure extent of need of training courses as perceived by the extension personnel working for transfer of agricultural technology.

Materials and Methods

Among the available techniques for developing a scale, the method of summing rating suggested by Likart (1932) was found appropriate due to large number of items. The steps followed in development of scale to measure extent of need of training courses as perceived by the extension personnel are discussed below.

Identification and selection of indicators

The available literature reviewed and from them 13 indicators related training needs of extension personnel were resorted. A list of indicators was circulated among 50 extensionists and their opinions were obtained on 5 point continuum to know its appropriateness for the study. The indicator wise frequencies were converted in master sheet. For each indicator weighted mean and standard error were calculated. The obtained values were arranged in ascending order. Out of 13 indicators, those having less than 70 per cent value were omitted.

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In this way 08 indicators viz.; (i) Information and Communication Technology (ICT), (ii) Agricultural extension and communication skills, (iii) Horticulture and post harvest technologies, (iv) Crop production, (v) Plant protection measures, (vi) Animal husbandry and dairying, (vii) Soil and water management and (viii) Agricultural economics and agricultural marketing, were finalized for the study.

Item collection

Initially, numbers of statements covering the entire training needs of extension personnel were collected from the relevant literatures. As such battery of 110 statements representing the training needs of extension personnel were drafted under the selected indicators. The statements thus collected were carefully examined in the light of the fourteen criterion suggested by Thurstone & Chave (1929)^[7] and Edwards and Kilpatrick (1948)^[2]. Out of 110 statements, 93 statements which satisfied the criteria were selected.

Selection of items

These statements were then subjected to scrutiny by an expert panel of judges to determine the relevancy. For this purpose a schedule was prepared with 93 statements and sent online through 'Google forms' as well as through personal contacts to the personnel working as extension educationist, sociologist and psychologist from various universities of India for judging the relevancy of items. Out of 100, 65 judges were responded. The responses were obtained on five point continuum viz., 'strongly needed', 'needed', 'undecided', 'not needed' and 'strongly not needed' with scores of 5, 4, 3, 2 and 1 respectively. Based on 65 responses of these judges, scoring and analysis of the statements were done.

Relevancy test

From the data so gathered, relevancy per cent, relevancy weightage and mean relevancy score were worked out for all the 93 items individually, using the formulae given by Edward (1969). Using these three criteria, the items were screened for their relevancy. Accordingly, items having relevancy percentage of more than 75 per cent, relevancy weightage of more than 0.75 and mean relevancy score of more than 3.75 were considered for final selection. Thus, finally 75 statements were selected in the first stage.

Item analysis

It was essential to delineate the items based on the extent to which they can differentiate the respondent with high training needs than the respondent with low training needs. For this purpose, item analysis was carried out on the statements selected in the first stage. A schedule consisting of 75 statements was prepared and used for personally interviewing a sample of 40 extension personnel from non-sampled area. The responses for the statements were obtained on a five point continuum viz., strongly needed, needed, undecided, not

needed and strongly not needed with scores of 5, 4, 3, 2 and 1, respectively. The training need score of the respondent was obtained summing up the scores of all statements.

Thus, total score obtained by each respondent was calculated by component wise and the scores of respondents were arranged in the descending order. For the purpose of item analysis, 25 per cent of the respondents with highest total scores and 25 per cent of the respondents with lowest total scores were selected. Thus, out of 40 extension personnel to whom the items were administered for the item analysis, 10 extension personnel with lowest scores and 10 with highest scores were used as criterion groups to evaluate individual items. These two groups provided the criterion groups in terms of which item analysis was conducted. The 't' value was a measure of the extent to which a given statement differentiates the high group from the low group. The 't' value for each statement was calculated using the formula given by Edwards (1969).

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum(X_H - \bar{X}_H)^2 + \sum(X_L - \bar{X}_L)^2}{n - (n - 1)}}$$

$$\sum(X_H - \bar{X}_H)^2 = \sum X_H^2 - \frac{(\sum X_H)^2}{n} \text{ and}$$

$$\sum(X_L - \bar{X}_L)^2 = \sum X_L^2 - \frac{(\sum X_L)^2}{n}$$

Where,

- $\sum X_H^2$ = Sum of the squares of the individual scores in the high group
- $\sum X_L^2$ = Sum of the squares of the individual scores in the low group
- \bar{X}_H = Mean score on a given statement for the high group
- \bar{X}_L = Mean score on a given statement for the low group
- n = Number of respondents in each group
- t = Extent to which a given statement differentiate between high and low group

According to summated ratings method, a set of 59 statements was desired that were differentiating between the high and low groups. After computing the 't' value for all the items, the statements having 't' value equal to or greater than 1.75 were selected (Table 1). Based on the 't' value, 59 statements were finally selected to measure the extent of need of training courses as perceived by the extension personnel.

Table 1: Selected extent of need of training courses for the present study

Sr. No	Statements	't' value
A	Information and communication technology (ICT)	
1.	Use of smartphone mobile apps in agriculture	2.42
2.	Skills required to conduct trainings on computer applications	3.42
3.	Explore and use of the internet and search engines for quick transfer of agricultural technology	3.16
4.	Use of social media for transfer of agricultural technology	4.91
5.	Application of Remote Sensing and Geographic Information Systems	4.65
6.	Smart use of e-commerce for online purchasing order of agri-inputs and agri-equipments	3.24
7.	Utilization of farmers' web portals	6.53
8.	Fruitful use of services of Kisan Call Centres	4.71
B	Agricultural Extension and Communication Skills	
1.	Public-Private Partnership in agriculture extension services	4.56
2.	Up gradation of communication skills (reading, listening, speaking and writing skills)	3.13
3.	Innovative methods for effective training programs	3.67
4.	Gender sensitization	4.59
5.	Recent extension approaches for agri-preneurship development	7.2
6.	Extension strategies for promotion of climate smart livelihood opportunities	6.12
7.	Market led extension strategies	8.57
8.	Recent agricultural development policies in agriculture	5.25
9.	Selection and use of innovative extension teaching methods	4.91
C	Horticulture and Post harvest Technologies	
1.	Advance production and post-harvest technology of major fruits	2.42
2.	Advance production and post-harvest technology of major vegetable crops	3.33
3.	Production and management of quality planting material in nursery	6.12
4.	Value addition in fruits and vegetables	3.67
5.	Innovative production techniques for doubling farmers' income through fruit and vegetable crops	5.25
6.	Organic farming of fruit and vegetable crops	4.91
7.	Production techniques of flowers and ornamental plants	2.44
8.	Training and pruning in orchards	1.94
D	Crop production	
1.	Sustainable sugarcane production technology	4.09
2.	System of Rice Intensification (SRI) technique	8.14
3.	Innovative production techniques for doubling farmers' income through field crops	3.39
4.	Integrated farming system for sustainable agriculture production	4.71
5.	Weed management techniques	3.13
6.	Climate change adaptation in agriculture	4.00
7.	Advance Storage techniques	3.12
E	Plant Protection Measures	
1.	Integrated Pest Management (IPM) techniques	4.65
2.	Eco-friendly use of plant protection measures	3.24
3.	Use of plant protection equipments	4.77
4.	Prevention and suppression of plant pathogenic organisms	6.12
5.	Identification of different pests infesting to crops and their integrated management	4.09
6.	Identification of different diseases infesting to crops and their integrated management	2.28
7.	Use of beneficial micro-organisms	1.90
F	Animal husbandry and Dairying	
1.	Sustainable dairy farming	2.42
2.	Good management practices in livestock production	6.70
3.	Technology innovation and commercialization in animal husbandry	4.22
4.	Fodder production, conservation and utilization	6.60
5.	Indigenous Technological Knowledge (ITK) in animal husbandry	4.56
6.	Integrated Nutrient Management (INM) in dairy animals	6.6
7.	Value addition in milk and milk products	3.67
G	Soil and water Management	
1.	Integrated Nutrient Management (INM) for macro and micro nutrients	2.42
2.	Reclamation of saline and sodic soils	6.54
3.	Necessary precautions in the use of fertilizers	3.24
4.	Irrigation methods and drainage	4.09
5.	Modern irrigation systems design and maintenance of irrigation systems	2.28
6.	Water harvesting techniques	4.65
H	Agricultural Economics and Agricultural Marketing	
1.	Intellectual Property Rights (IPR) related issues	4.91
2.	Cost of cultivation and inputs use	4.56
3.	Benefits of Kisan Credit Card	6.60
4.	Export opportunities in agriculture products	6.60
5.	Institutions and policies in agricultural marketing	7.07
6.	Supply Chain Management	5.25
7.	Co-operative marketing	3.16

Reliability of the scale

A scale is said to be reliable when it consistently produces the same results when applied to measure the same phenomenon from time to time. For this study test-retest method of reliability was used. The training need scale with items as developed was administered to the 30 extension personnel who were neither previously contacted nor had chance to come in the final sample. After 15 days the same 30 extension personnel were given the test. Two sets of scale score were thus obtained. Each of the two sets of statements was treated as a separate scale and then these two sub-scales were correlated. The coefficient of reliability was calculated by the Rulon's formula (Guilford, 1954) ^[4], which was 0.88. Thus, the scale developed for the purpose was found highly reliable.

Chicago Press, USA, 1929, 39-40.

Validity of the scale

The validity of a test depends upon fidelity with which it measures what it is expected to measure (Kerlinger, 1967) ^[5]. The content validity of the scale was tested. It is the degree or sampling completeness of the substance, the content, the issue and the subjects of an estimating instrument. This technique was utilized in the current scale for deciding the content validity of the scale. As the substance of the disposition was overall secured the topic under the examination through literatures and expert opinions, it was found that current scale has fulfilled the content validity.

Administering the scale

Likert (1932) ^[6] suggested five point continuums to get responses from respondents. There are eight components/courses in the scale, all statements/topics under each courses were positive. The extension personnel were asked to express their extent of need in terms of 'strongly needed', 'needed', 'undecided', 'not needed' and 'strongly not needed' with respective weights of 5, 4, 3, 2, and 1 for all the statements/topics.

Application of research

It is applicable to measure the extent of need of training courses as perceived by the extension personnel. It assists the training organizers to design and develop training programmes as per the requirement of the extension personnel. Moreover, these would then really boost their capability in the desired areas.

Research Category: Agricultural Extension, Training need, Extension Personnel.

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