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A SCALE TO MEASURE THE PROFESSIONAL COMPETENCE OF EXTENSION PERSONNEL

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ABSTRACT

Agricultural extension and advisory services are crucial for enhancing food security and economic stability. To effectively address modern agricultural challenges, it is essential for extension personnel to possess new and relevant competencies. This study aimed to develop a standardized scale for measuring the professional competence of extension personnel. The scale development process involved several stages, including the identification of dimensions, statement collection, relevancy testing, item analysis, and tests for reliability and validity. A total of 67 statements across nine dimensions were retained for the final scale, demonstrating high reliability (r = 0.774) and construct validity. This standardized scale can be used to assess the competence of extension personnel, aiding policymakers in making informed decisions to enhance the effectiveness of extension services.

Keywords: *professional competence, extension personnel, agricultural extension, scale development, competence assessment*

INTRODUCTION

The concept of competency was first proposed by David McClelland in 1973, challenging traditional assessment criteria that emphasized intelligence evaluation in the higher education system. Since then, competencies have emerged as the primary means of evaluating abilities and job skills in various professional domains (Harikrishna et al., 2023a). According to Boyatzis (1982), competence refers to a person's underlying characteristics that are causally related to job performance. Stone (1997) defined competencies as the application of knowledge, technical skills, and personal characteristics to the needs of individuals and groups to provide effective job performance and make human resource decisions. Hoffmann (1999) further emphasized that the underlying qualifications and characteristics of a person, their observable behaviors, and the standard of individual performance outcomes are all important criteria in defining competencies. In contemporary organizational settings, competencies serve as a tool or point of reference to assess and evaluate worker performance progress, particularly in evaluating proficiency in both hard and soft skills.

In agricultural development, extension and advisory services play a vital role in ensuring nutritional security, food sovereignty, and economic stability. To contribute effectively towards agricultural development, extension personnel need new and relevant competencies to confront present challenges in agriculture (Harikrishna et al., 2023b). The competency gap, defined as the gap between expected and existing competence of employees, needs systematic assessment so that proper measures can be taken to increase competence levels and thereby boost organizational development in both public and private sectors. However, the absence of standardized tools to measure professional competence of extension personnel has made it difficult for organizations to identify specific competency gaps and design targeted capacity-building programs.

OBJECTIVE

To develop a scale to measure the professional competence of extension personnel

METHODOLOGY

To measure the professional competence of extension professionals, the method suggested by Likert (1932) in developing summated rating scale was followed. The competence scale was developed through the following stages: identification of dimensions, collection of statements, relevancy test, item analysis, reliability test, and validity test. The methodology followed as suggested by Jyotishree et al. (2024); Aparna et al. (2023); Patel et al. (2023); Harikrishna et al. (2021).

Identification of dimensions

Based on review of past studies and discussion with experts, twenty-one components most relevant to measure professional competence were identified. The enlisted components were circulated to fifty experts to give their opinion as most relevant, relevant, and not relevant. Based on

obtained scores and suggestions of judges, nine dimensions of professional competence were finally retained: knowledge, administration, program planning, program implementation, program evaluation, organizing skill, human relation skill, communication skill, and teamwork and leadership. Communication skill received the highest relevancy percentage at 98.30 percent, followed by organizing skill and administration at 94.40 percent each.

Collection of statements

Relevant statements covering the universe of content in measurement of professional competence were collected through extensive literature review and discussion with experts. A total of 150 statements reflecting professional competence of extension personnel were generated. The statements were edited using criteria suggested by Edward (1957), and finally 136 statements were retained after deleting ambiguous, irrelevant and nonconforming statements.

Relevancy test

The relevancy of generated items was established by sending statements to 150 judges with appropriate instructions. The judges comprised experts from state agricultural universities and ICAR institutes. Experts rated the degree of relevancy of each item on a four-point continuum as Most relevant (MR), Relevant (R), Less relevant (LR) and Not relevant (NR) with scores 3, 2, 1 and 0, respectively. Out of 150 judges, 60 responded within one month. The appropriateness of each item was defined with relevancy weightage (RW), relevancy percentage (RP) and mean relevancy score (MRS). Statements having RW more than 0.75, RP more than 75.00 percent and MRS more than 2.25 were retained, thereby including 106 items in the scale.

Item analysis

The selected 106 statements were subjected to item analysis to demarcate items based on their ability to differentiate respondents with high and low professional competence. Scrutinized statements were administered to 40 respondents during 2021-2022. Respondents indicated their degree of agreement or disagreement with each statement. Total scores were arranged in descending order, with 25 percent highest scores (high group) and 25 percent lowest scores (low group) taken for item analysis. The critical ratio (t-value) was calculated as a measure of the extent to which a given statement differentiates between high and low groups. After calculating t-values for all items, 67 statements with highest t-value equal to or greater than 1.75 were selected following the thumb rule of rejecting items with t-value less than 1.75.

Selection of statements for final scale

After computing "t" value for all the items, 67 statements with highest "t" value equal to or greater than 1.75 were selected. The thumb rule of rejecting items with't' value less than 1.75 was followed. As per the thumb rule selection of items to be retained in the scale, includes the scales with highest discriminating values excluding the scales with poor discriminating ability and questionable validity. Thus, 67 statements were retained for consideration in the final scale.

Table 1: Distribution of statements across competence dimensions

Sr. No	Competency Dimension	Number of Statements	Example Statements
1	**Knowledge**	7	Organization's mandates and objectives, Technical knowledge in subject area, Information and communication technology
2	**Administration Skill**	5	Formulate realistic goals, Supervise budget expenditures, Manage time effectively
3	**Programme Planning Skill**	9	Conduct need assessment, Identify and prioritize needs, Conduct baseline survey
4	**Programme Implementation Skill**	7	Conduct farm and home visits, Coordinate extension programs, Demonstrate negotiation skills
5	**Programme Evaluation Skill**	5	Apply qualitative and quantitative tools, Conduct PRA/RRA, Write evaluation reports
6	**Organizing Skill**	8	Mobilize people to take action, Organize farmers into groups, Organize farmers field school
7	**Human Relation Skill**	7	Understand viewpoint of others, Empathetic towards others; Establish rapport with farmers
8	**Communication Skill**	8	Convey extension messages effectively, Make effective presentations, Transfer feedback to researchers
9	**Teamwork and Leadership Skill**	11	Focus on team success, Identify team members strengths, Guide and supervise subordinates
	Total	67	

RESULTS AND DISCUSSION

Scale development and validation framework

The present study followed a systematic psychometric approach for scale development, similar to frameworks reported in competency assessment literature. Similar scale construction methodologies have been reported by Sasidhar and Suvedi (2016), who identified core competencies for livestock extension personnel, and by Ghimire (2016), who developed a competence index for agricultural extension professionals in Nepal. These studies employed a domain-wise structured psychometric validation approach, supporting the robustness of the present design. The systematic progression through dimension identification, statement collection, relevancy testing, item analysis, and validation ensures scientific rigor in the developed instrument.

Reliability of the scale

Split-half reliability was used using the odd-even method. The scale was administered to 30 respondents and responses were collected. Scores obtained for all odd items and all even items were pooled. The two sets of scores were correlated using Pearson's product moment correlation. The correlation coefficient (r = 0.632) for the half test was obtained. The reliability of the full test was found to be 0.774, indicating appreciable reliability of the scale.

The Cronbach alpha reliability score of 0.774 for the present scale closely aligns with values observed in other competency scales, such as the watershed-based competency scale (0.810) developed by Ravi and Patil (2022). This similarity in reliability benchmarks reflects the internal consistency and applied relevance of the developed scale. According to the reliability classification suggested by researchers in psychometric studies, a Cronbach alpha value above 0.70 is considered acceptable for newly developed scales, and values above 0.75 indicate good reliability. The obtained reliability coefficient demonstrates that the scale items consistently measure the underlying construct of professional competence across different dimensions.

Validity of the scale

A construct is validated by the method of internal consistency (Anastasi, 1976). The essential characteristic of this method is that the criterion is the total score of the test itself. The method involves finding correlation of component scores with total scores. The correlation coefficients of competence with different components namely knowledge, administration, program planning, program implementation, program evaluation, organizing skill, human relation skill, communication skill and teamwork and leadership were 0.735, 0.827, 0.836, 0.923, and 0.928, respectively. The high values of correlation coefficients justified the construct validity of the scale.

The strong positive correlations between individual competency dimensions and overall competence score indicate that all nine dimensions contribute meaningfully to the overall professional competence construct. The highest correlation was observed for program evaluation (0.928) and program implementation (0.923), suggesting these dimensions are central to extension personnel's professional effectiveness. The lowest correlation with knowledge dimension (0.735), while still substantial, indicates that knowledge alone is insufficient and must be complemented by skills and abilities in other domains for comprehensive professional competence.

Standardized scale to measure professional competence

The scale was developed with appropriate steps and tested for reliability and validity. Therefore, the scale developed to measure professional competence of extension personnel is considered standardized. The final scale consists of 67 statements across nine dimensions: Knowledge (7 statements), Administration skill (5 statements), Program planning skill (9 statements), Program implementation skill (7 statements), Program evaluation skill (5 statements), Organizing skill (8 statements), Human relation skill (7 statements), Communication skill (8 statements), and Teamwork and leadership skill (11 statements).

The distribution of items across dimensions reflects the relative importance and complexity of each competency area. Program planning received the highest number of items (9 statements), followed by teamwork and leadership (11 statements), indicating the critical role of these competencies in extension work. The multi-dimensional nature of the scale ensures comprehensive assessment of professional competence, moving beyond traditional knowledge-focused evaluations to include behavioral and skill-based components essential for effective extension service delivery.

Pre-testing

The developed scale was pre-tested with 60 respondents (extension personnel and scientists) in a non-sample area to assess suitability and observe difficulties in test administration. No difficulty or inadequacy was found in test administration or in observing and recording respondent views. The pre-testing phase confirmed that the language used in the scale items was clear, unambiguous, and easily understood by the target audience, ensuring the scale's practical applicability in field conditions.

Method of scoring

Responses were obtained on a five-point continuum: strongly agree (SA), agree (A), undecided (UD), disagree (DA) and strongly disagree (SDA) with weightages of 5, 4, 3, 2 and 1 for positive statements. Reverse scoring was employed for negative statements. Total attitude score for each respondent was calculated. The possible total score ranges from 67 to 335.

Computation of overall professional competence index

Professional competence index of respondents was determined using the formula: Professional Competence Index = (Actual score / Maximum Score) × 100. Overall professional competence index was calculated for each respondent and grouped into five categories using arbitrary classification: Very low (0-20), Low (21-40), Medium (41-60), High (61-80), and Very high (81-100).

CONCLUSION

The developed scale can be utilized as a standardized and reliable tool to measure the professional competence of extension personnel across nine essential dimensions. It enables organizations, training institutions, and researchers to systematically assess both the perceived importance and the existing levels of competence among extension functionaries. By identifying specific competency gaps, the scale helps planning of training and capacity building programs tailored to the needs of extension professionals. Its comprehensive structure ensures the core behavioral, technical, and managerial skills are adequately evaluated, thereby contributing to the development of a more competent and effective extension workforce capable of addressing emerging challenges in agricultural development.

IMPLICATIONS

The standardized scale developed in this study has significant practical implications for assessing professional competence of extension professionals, enabling policymakers to make informed decisions regarding training, recruitment, and performance evaluation. By identifying specific competency gaps, the scale can guide design of targeted capacity-building programs, ensuring extension personnel are equipped to meet evolving challenges of agricultural development. Furthermore, the scale can be used in comparative studies across different regions or organizations to benchmark competence levels and improve overall effectiveness of extension services. Continued validation and refinement of the scale in diverse contexts will enhance its reliability and applicability, making it a valuable tool for both academic research and practical implementation in agricultural extension.

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CONFLICT OF INTEREST

No conflict of interest exist among the authors**.**

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