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Developing a scale to study attitude of administrative staff at Agricultural University under methodological lens

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Abstract
The primary purpose of this study is to design and validate a standardized measuring scale tailored to assess the perceptions of administrative staff at Kerala Agricultural University regarding their occupational roles and engagement with their institutional environment. The study employed mixed methodological approach of online survey with experts and personal face-to face interviews with administrative staff. An initial pool of 52 items was generated through an extensive literature review. These items were evaluated by a panel of 60 experts to determine their scale values and quartile values. Content validity was used to ensure the relevance and appropriateness of the items, resulting in the selection of 21 items for the final attitude scale. The scale's reliability was tested by administering it to 30 individuals outside the main sample group. This research explores the concept of attitude in the workplace, emphasizing its implications for organizational functioning. It also examines the development and utility of an attitude scale as a tool for assessing workforce sentiments. It ensures that the attitude scale is robust, reliable, and valid for its intended use in research or practical applications. This study broadens the understanding of workplace engagement by introducing a validated attitude scale tailored to administrative staff, extending its relevance within organizational behaviour in academic settings. This study offers original value by filling a notable gap in evaluating the attitudes of administrative personnel in academic institution, with a specific focus on Kerala Agricultural University. While much research has focused on faculty or scientific personnel, limited attention has been given to understanding the perceptions and engagement levels of administrative staff, who play a crucial role in institutional functioning

Keywords: Attitude; administrative staff; reliability; validity; agriculture

Introduction
Attitude is a fundamental psychological construct that significantly influences individual behaviour, decision-making, and performance within organizations. As a psychological construct, attitude encompasses an individual's thoughts, and feelings toward various aspects of their work environment including tasks, colleagues, leadership, and organizational policies. Understanding employees' attitudes is essential for fostering a positive organizational climate, enhancing job satisfaction, and promoting productivity. It reflects an individual's evaluations, feelings, and tendencies toward various elements of their work environment, including roles, colleagues, supervisors, and institutional values (Robbins and Judge, 2019) [4]. In academic and professional environment, positive attitudes are often associated with enhanced job satisfaction, organizational commitment, and overall productivity (Luthans, 2011) [2].

To effectively understand and manage these attitudinal variables, organizations increasingly rely on standardized measurement tools such as attitude scales. These instruments help quantify subjective perceptions, offering valuable insights into the collective mindset of employees (Oppenheim, 2000) [3]. Through systematic assessment, attitude scales facilitate informed decision-making in areas such as staff development, policy formulation, and change management (Schriesheim and Tsui, 1980) [5]. Furthermore, they serve as diagnostic tools that can highlight potential areas of dissatisfaction or resistance, enabling proactive interventions that support a healthier organizational culture (Ajzen, 2001) [1].

Methodology

1. **Selection of respondents:** A total of sixty agricultural extension experts were randomly selected from various domains such as research, extension, and academic institutions under SAUs, Indian Council of Agricultural Research (ICAR) institutes, the National Institute of Agricultural Extension Management (MANAGE), and the National Institute of Rural Development (NIRD) for the study.
2. **Data collection:** The process of developing the attitude scale involved item collection, item analysis, scale value determination, standardization, and evaluating the validity and reliability of the finalized scale by Meenambigai *et al*., 2023 [6].
3. **Item collection:** A preliminary pool of statements relevant to the study was developed from literature, previous studies, and expert consultations. These statements were refined based on established criteria for attitude statements recommended by Edwards (1957) [7], Thurstone and Chave (1929) [8], Wang (1932) [9], Likert (1932) [10], Bird (1940) [11], and Edwards and Kilpatrick (1948) [12].
4. **Item analysis:** The items were evaluated using a five-point response scale ranging from 'Most Relevant (MOR)', 'More Relevant (MR)', 'Relevant (R)', 'Less Relevant (LR)', and 'Not Relevant (NR)' assigning a score of 4,3,2,1 and 0 respectively by a panel of experts through postal correspondence, Google Forms, and in-person interactions. This screening process was designed to eliminate weak or irrelevant content. Evaluators were also encouraged to suggest modifications, additions, or deletions to improve the quality of the statements.
5. **Determination of scale value and quartile value:** Based on the ratings, the median and Q value were computed for each statement, with the median serving as the scale value assigned to that statement. The scale value was worked out with the help of formula:

$$S = l + \left(\frac{0.50 - \sum P_b}{P_w}\right) i$$

Where,
S - median or scale value of the statement
l - the lower limit of the interval in which the median falls
$\sum P_b$ - the sum of the proportions below the interval in which the median falls
P_w - the proportion within the interval in which the median falls
i - the width of the interval and is assumed to be equal to one
The inter quartile range or Q value for each statement was worked out by the formula:
$Q = C_{75} - C_{25}$
C_{75} was the 75th centile and calculated by the formula:

$$C_{75} = l + \left(\frac{0.75 - \sum P_b}{P_w}\right) i$$

where,
l - the lower limit of the interval in which the 75th centile falls
$\sum P_b$ - the sum proportion below the interval in which the 75th centile falls
p_w - the proportion within the interval in which the 75th centile falls
C_{25} was the 25_{th} centile and estimated by the formula:

$$C_{25} = l + \left(\frac{0.25 - \sum P_b}{P_w}\right) i$$

where,
l - the lower limit of the interval in which the 25th centile falls
$\sum P_b$ - the sum proportion below the interval in which the 25th centile falls
p_w - the proportion within the interval in which the 25th centile falls
A higher Q value suggests that a statement was ambiguous or difficult to rate. Therefore, statements with high Q values were generally considered for elimination. In cases where multiple statements had the same scale value, preference was given to those with lower Q values, indicating higher clarity and reliability.

Standardization of the scale: Reliability and validity were key factors in scale construction, ensuring the tool consistently and accurately measured the concept it was designed to assess.

Validity test of the scale: The Item-level Content Validity Index (I-CVI) was used to assess the relevance of individual scale items by calculating the proportion of experts who rated each item as relevant. The I-CVI ranged from 0 to 1, with higher values indicating stronger agreement (Abdollahpour *et al*., 2010) [13]. Items with an I-CVI below 0.7 were considered for elimination, those scoring between 0.7 and 0.79 required revision, and items with an I-CVI above 0.79 were deemed suitable for inclusion in the study. The Scale-level CVI (S-CVI/Ave) was obtained by averaging the I-CVIs across all items. An S-CVI/Ave of 0.9 or above reflected excellent content validity, indicating strong expert consensus on item relevance.
To address potential limitations of CVI, (Wynd *et al*., 2003) [14] recommended supplementing it with multi-rater kappa statistics, which account for chance agreement and provide a more accurate measure of inter-rater reliability. For the estimation of modified kappa value, each items probability of chance agreements was calculated by the formula:

$$P_C = \frac{N!}{A!\,(N-A)!} \text{ X } 0.5^N$$

where,
N - number of experts in a panel
A - number of panelists who agree that the item is relevant.
Finally, kappa value is estimated by formula:

$$K = \frac{(ICVI - P_C)}{(1 - P_C)}$$

where,
I-CVI - item level content validity index
P_C - probability of chance agreement.

Kappa statistic values were interpreted as follows: 0.40 to 0.59 indicated fair agreement, 0.60 to 0.74 signified good agreement, and values above 0.74 were considered excellent. Items falling within the good to excellent range were retained for further analysis.

Reliability test of the scale: To statistically verify the reliability of the scale, a pilot test was conducted with 30 administrative staff who were not part of the main study sample. Participants rated each statement on a five-point Likert scale, ranging from "strongly agree" (5) to "strongly disagree" (1) for positive items, with reverse scoring applied to negative items. Reliability was measured using Cronbach's alpha, as proposed by (Cronbach, 1951) [15], to assess the internal consistency of the scale. This coefficient ranges from 0 to 1, with higher values indicating greater reliability. The Cronbach's alpha was computed using the following formula:

$$\alpha = \frac{N.\bar{C}}{\bar{v} + (N-1).\bar{C}}$$

where,
N - number of items
$\bar{C}$ - average covariance between item pairs
$\bar{V}$ - average variance.
The proposed scale containing statements were presented to the selected respondents. Those statements with Cronbach's alpha value greater than 0.7 is acceptable and excellent whereas those with less than 0.7 is poor and thus rejected.

Finalizing the scale: The attitude scale was developed using the Scale Product Method, originally introduced by (Eysenck and Crown, 1949.) [16], which integrates Likert's method with Thurstone's Equal Appearing Interval Scale for item selection. This statistical technique is commonly employed in psychological research to analyse personality traits. In this method, individual scores are calculated by multiplying the Likert response value by the scale value determined through Thurstone's approach for each item. The sum of these products across all items provides a quantitative measure of a respondent's attitude. Based on the scores obtained by the respondents, they were categorized into low, medium and high attitude.

Result and discussion: A set of 52 distinct statements was initially developed and distributed to 100 subject-matter experts. However, only 60 judges responded within the given timeframe. Using the relevancy scores provided, scale values and quartile (Q) values were calculated for each statement. Eleven statements with high Q values and scale values were identified and subsequently excluded due to ambiguity. The remaining 41 statements advanced to the next stage of screening. These statements then underwent a standardization process, including a content validity assessment at both the item level (I-CVI) and the scale level (S-CVI/Ave).

Table 1: Content validity test of the developed items

Items	Relevancy count	I-CVI	Interpretation	Items	Relevancy count	I-CVI	Interpretation
S1	48	0.8	Appropriate	S22	41	0.68	Disposed
S2	46	0.77	Modified	S23	52	0.9	Appropriate
S3	42	0.7	Modified	S24	52	0.9	Appropriate
S4	37	0.62	Disposed	S25	48	0.8	Appropriate
S5	48	0.8	Appropriate	S26	40	0.67	Disposed
S6	48	0.8	Appropriate	S27	43	0.72	Modified
S7	40	0.67	Disposed	S28	52	0.9	Appropriate
S8	52	0.9	Appropriate	S29	51	0.9	Appropriate
S10	51	0.9	Appropriate	S30	52	0.9	Appropriate
S11	52	0.9	Appropriate	S31	52	0.9	Appropriate
S12	48	0.8	Appropriate	S32	37	0.62	Disposed
S13	48	0.8	Appropriate	S33	48	0.8	Appropriate
S14	42	0.7	Modified	S34	52	0.9	Appropriate
S15	36	0.6	Disposed	S35	52	0.9	Appropriate
S16	52	0.9	Appropriate	S36	52	0.9	Appropriate
S17	32	0.53	Disposed	S37	51	0.9	Appropriate
S18	24	0.4	Disposed	S38	39	0.65	Disposed
S19	48	0.8	Appropriate	S39	52	0.9	Appropriate
S20	48	0.8	Appropriate	S40	52	0.9	Appropriate
S21	50	0.9	Appropriate	S41	48	0.8	Appropriate
S-CVI/Ave = 0.890							

*I-CVI - item level content validity index

Data from the Table 1., shows that 9 statements having I-CVI value less than 0.70 were rejected, 4 statements having value between 0.70 and 0.79 were revised and 28 statements having value greater than 0.79 were found to be appropriate for the scale. Therefore, 32 statements were retained for the scale development. Since, the S-CVI/Ave score greater than 0.89, it indicates that the scale's overall content validity is high. To overcome the restrictions in content validity, multi-rater kappa statistics value was estimated. The result of Kappa value in Table 2. shows that those items with kappa value greater than 0.74 were excellent and those items with kappa value less than 0.74 were removed. Thus 21 items were retained in the scale construction.

Table 2: Kappa value of the developed items

Items	PC	K value	Interpretation	Items	PC	K value	Interpretation
S1	3.78E-06	0.9	Excellent	S23	0.013325	0.69	Disposed
S2	0.013325	0.69	Disposed	S24	0.000553	0.79	Excellent
S3	0.000553	0.79	Excellent	S25	3.78E-06	0.9	Excellent
S5	3.78E-06	0.9	Excellent	S27	0.000553	0.79	Excellent
S6	0.000553	0.79	Excellent	S28	1.15E-44	0.72	Disposed
S8	0.000553	0.79	Excellent	S29	3.78E-06	0.9	Excellent
S9	1.15E-46	0.72	Disposed	S30	3.78E-06	0.9	Excellent
S10	0.013325	0.69	Disposed	S31	0.000553	0.79	Excellent
S11	3.78E-06	0.9	Excellent	S33	0.013325	0.69	Disposed
S12	0.000553	0.79	Excellent	S34	3.78E-06	0.9	Excellent
S13	0.000553	0.79	Excellent	S35	1.15E-46	0.72	Disposed
S14	1.15E-46	0.72	Disposed	S36	0.000553	0.79	Excellent
S16	3.78E-06	0.9	Excellent	S37	1.53E-46	0.69	Disposed
S19	0.013325	0.69	Disposed	S38	0.013325	0.69	Disposed
S20	3.78E-06	0.9	Excellent	S40	0.000553	0.79	Excellent
S21	0.000553	0.79	Excellent	S41	3.78E-06	0.9	Excellent

*P_C - probability of chance agreement *K value – kappa value

For checking the reliability of the constructed scale, the 21 statements were subjected for a pilot testing in 30 non-sample respondents i.e., administrative staff. The statements were presented to respondents using a five-point continuum: Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), and Strongly Disagree (SD), assigned scores of 4, 3, 2, 1, and 0, respectively for positive statements, and 0, 1, 2, 3, and 4, respectively for negative statements. Cronbach's alpha method was used to test reliability of the constructed scale. The Cronbach's alpha value obtained for the scale was 0.90, which had higher internal consistency of the scale. Thus, the scale was confirmed as reliable.

Conclusion

The development of the attitude scale marks a significant step toward understanding the work-related attitudes of administrative staff within Kerala Agricultural University. By employing a structured methodological approach such as combining expert judgment, item analysis, and validity and reliability testing, the study resulted in a refined set of scale items that accurately capture key dimensions of job perception and institutional involvement. This scale not only contributes to academic research but also offers practical value for administrative staffs and policymakers aiming to assess and improve performance across similar academic settings.

Author contribution

The first author is a doctoral research scholar, has authored this article based on her doctoral research at Kerala Agricultural University. The university provided financial support for the research. However, the author takes complete responsibility for the accuracy of the facts, opinions expressed, and conclusions drawn in the article. Her extensive study, conducted under the auspices of Kerala Agricultural University, explores detailed aspects of the subject matter.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix

Please put a (✓) mark in any one of the five alternatives provided against each statement to indicate your degree of agreement or disagreement to each statement. [Strongly

Agree (SA), Agree (A), Neutral (N), Disagree (D), Strongly Disagree (SD)]

Sl. No.	Statements	SA	A	N	D	SD
1	I am punctual and always prepared to start working right away					
2	When dealing with peers, superiors, and customers, I operate with the utmost professionalism					
3	Failure to complete duties as prescribed due to my lack of drive and passion toward job					
4	When my colleagues execute jobs without continual supervision, I show initiative and a proactive approach					
5	I pay little attention to all duties and documents					
6	I respond quickly to calls and emails					
7	I am highly organized, successfully managing my work, schedules, and files					
8	I am rigid and non-flexible in my workflow					
9	I always disregard privacy and secrecy while dealing with sensitive materials					
10	I am ready to partake in in-service training if necessary					
11	In order to overcome challenges or issues, I actively seek solutions					
12	I refrain from engaging in gossip or negative comments about co-workers or superiors					
13	I have good communication abilities, enabling efficient teamwork and transparent communication with stakeholders					
14	I am poor at managing workload					
15	I prioritize offering outstanding service to both internal and external clients, reacting quickly to questions and addressing complaints					
16	I struggle to perform multiple tasks simultaneously					
17	I provide adequate notice and justification for any early departures					
18	I show a desire to learn and eager to acquire more knowledge					
19	I actively contribute to a positive team environment					
20	I display lack of ownership for mistakes and blaming others					
21	I fail to fulfil deadlines					