Development and Validation of Farmer's Attitude Scale towards Anand Agricultural University

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ABSTRACT

Anand Agricultural University is a premier agricultural university in India. The purpose of this study was to develop a valid and reliable instrument for assessing farmers' attitudes toward Anand Agricultural University. The scale product method was used to construct the scale. It is a hybrid of the Likert and Thurstone techniques. A comprehensive list of 33 statements was prepared and finally, 26 statements were selected as they were found to be non-ambiguous. Based on the S value and Q value, 14 statements including 11 positive statements and 3 negative statements were chosen to construct a scale that would assess the attitude of farmers towards Anand Agricultural University. The scale was found reliable, with a reliability coefficient (0.827). The scale's validity was evaluated using expert judgment. This scale may be used to measure farmers' attitudes towards similar institutions or domains with suitable modifications.

INTRODUCTION

Anand Agricultural University is an esteemed agricultural institution in India with a rich history of over 75 years. It is widely recognized as a top-tier institution for agricultural education, research, and extension services. The university aims to assist the farming community in three key areas: education, research, and extension, focusing on fields such as agriculture, horticulture, food processing technology, agricultural engineering, agricultural information technology, and agri-business management. The university covers nine districts in Central Gujarat, including Ahmedabad, Anand, Botad, Chhotaudepur, Dahod, Kheda, Mahisagar, Panchmahals, and Vadodara encompassing 17.41 per cent of the state's geographic area (3.413 million hectares) (Anonymous, 2022). The Anand Agricultural University aims to promote the use of modern agricultural technologies that are location-specific, cost-effective, and readily accepted by farmers. Agriculture research and development plays a crucial role in addressing key societal issues, including sustainability, nutritional security, climate change, and energy conservation. Over time, agricultural research has expanded its scope to become more multidisciplinary, inclusive, and integrative. The university places a strong emphasis on broadening its research activity to help farmers in the state double their income by overcoming production constraints. Anand Agricultural University is well-positioned to meet the needs of farmers in the region, conducting research in areas such as soil and water management, organic farming, post-harvest technology, animal husbandry, biotechnology, climate change, soil health, food quality, and seed production. An institution dedicated to leveraging scientific and innovative approaches to advance societal prosperity and enhance farmer welfare since its inception. Keeping these things in view, the researcher has decided to develop the scale to measure attitude of farmers towards Anand Agricultural University.

METHODOLOGY

Attitude refers to the degree of the positive or negative effect associated with some psychological object (Thurstone, 1946). In

this study, an attempt has been made to develop a scale, which can scientifically measure the attitude of farmers towards Anand Agricultural University. Among the techniques available for the development of the scale, Thurston's equal appearing interval scale (1928) and the Likert's summated rating scale (1932) are quite well known. However, both the methods suffer from limitations, the first one in getting a discriminating response and the second one in the selection of items. Thus, the technique chosen to develop the attitude scale was 'Scale Product Method' which combines Thurston's technique of equal appearing interval scale for selection of the items and Likert's techniques of summated rating for ascertaining the response on the scale as proposed by Eysenck & Crown (1949). To create a reliable and valid attitude scale, the Scale Product Method was applied (Chauhan et al., 2016). A systematic procedure was followed for the scale construction as followed by Kumar et al., (2016); Gupta et al., (2022); Vijayan et al., (2022); Sherin et al., (2023). The steps followed to develop the scale were standard steps ranging from item selection, judges ratings, determination of scale and quartile value, reliability and validity testing and finally catagorisation/ weight assigning.

RESULTS AND DISCUSSION

The first step in developing an attitude scale is selecting statements or items. 33 statements related to farmers' feelings towards Anand Agricultural University were collected from literature, advisors, experts, and extension personnel. These statements were edited according to Thurston and Chave's, Likert's and Edward's criteria, resulting in the selection of 26 non-ambiguous statements for the scale. A panel of 50 judges consisting of extension educationists and social science experts from Anand Agricultural University and other universities were selected to rate each statement on a five-point equal appearing interval continuum from 'Strongly agree' to 'Strongly disagree.' Judges were visited personally and provided with instructions for rating the statements.

Determination of scale and quartile value

Based on the judgment of the 50 judges for each statement, the median value (S value) of the distribution and the quartile (Q value) for the statement were calculated for each statement. Then the interquartile range was worked out by taking the difference between C_{75} (Q_3) and C_{25} (Q_1), that means $Q = C_{75} - C_{25}$ for the each statement. Formulas of Median value (S value) and quartile (Q value):

$$S = L + \frac{0.50 - \sum Pb}{Pw} \times i$$

Where, S = Scale value, L = The lower limit of the interval in which the median falls, ΣPb = The sum of the proportion 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 1 (one).

$$C_{25} = L + \frac{0.25 - \sum Pb}{Pw} \times i$$

Where, C_{25} = The median or scale value of the statement, L= The Lower limit of the interval in which the 25th centile falls, P_b = The

sum of the proportion below the interval in which the 25th centile falls, P_w = The proportion within the interval in which the 25th centile falls, i = The width of the interval and is assumed to be equal to 1 (one).

$$C_{75} = L + \frac{0.75 - \sum Pb}{Pw} \times i$$

Where, C_{75} = The median or scale value of the statement, L = The Lower limit of the interval in which the 75th centile falls, P_b = The sum of the proportion below the interval in which the 75th centile falls, P_w = The proportion within the interval in which the 75th centile falls, i = The width of the interval and is assumed to be equal to 1.0 (one).

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

The final statement for the attitude scale

Statements were selected for the attitude scale based on the degree of agreement or disagreement among judges. Only statements with median values (S value) greater than Q values were chosen, but if some statements had similar scale values, those with the lowest Q values were selected. Based on these criteria, 14 statements were selected to form the attitude scale.

Establishing reliability and validity of the scale

Fourteen statements were selected for the final attitude scale and arranged randomly to prevent response biases that could affect reliability and validity. Eleven statements reflected a favorable attitude, while three indicated an unfavorable attitude. The five-point Likert continuum, which includes strongly agreed, agree, undecided, disagree, and strongly disagree, was used to represent agreement and disagreement with the statements. For favorable statements, weights of 5, 4, 3, 2, and 1 were assigned, while weights of 1, 2, 3, 4, and 5 were assigned for unfavorable statements. The weights of Likert's and Thurstone's techniques were combined, and an individual's total score was the sum of the product.

To ensure consistency in results, a reliable scale produces the same outcomes when applied to the same sample. Split-half method was used in this study. The 14 statements were split into two halves with 7 odd-numbered and 7 even-numbered statements and given to 20 respondents. Each half was treated as a separate scale, and the subscales were correlated, resulting in a reliability coefficient of 0.827 using Rulon's formula. The scale was found to be highly reliable.

Rulon's Formula: $rtt = 1 - \frac{\sigma^2 d}{\sigma^2 t}$

Where,

$$\sigma^2 d = \frac{\sum d^2 - \frac{(\sum d)^2}{20}}{20} \quad ; \quad \sigma^2 t = \frac{\sum t^2 - \frac{(\sum t)^2}{20}}{20}$$

Where, Rtt = Coefficient of reliability, $\sigma^2 d$ = Variances of differences, $\sigma^2 t$ = Variance of total score

The validity of the scale was examined for content validity. The content was selected by discussing it with 20 specialists of extension and academicians of Anand Agricultural University. Thus, the present scale was also satisfied the content validity.

Table 1. The scale to measure the attitude of farmers towards Anand Agricultural University

S.No.	Statements	Scale Value (S)	Interquartile Value (Q)
1	AAU is a lighthouse for farmers to resolve agricultural problems.	1.30	0.97
2	AAU brings desirable changes in the though process of farmers.	1.72	1.02
3	AAU helps farmers to become self-reliant.	1.58	1.03
4	AAU helps farmers in developing a scientific point of view.	1.46	1.12
5	Training given by the scientists of AAU is most practical to adopt.	1.69	1.19
6	AAU is beneficial to only resourceful farmers. (-)	2.50	1.94
7	AAU is a powerhouse to understand innovative farm ideas.	1.83	1.12
8	The association with AAU helps farmers to learn scientific managerial abilities.	1.70	1.02
9	AAU scientists are not wisdom-oriented to inculcate farming skills amongst the farmers. (-)	2.28	2.25
10	AAU is failed to magnetize the new generation towards farming. (-)	2.31	2.02
11	AAU scientists to improve my farming occupation.	1.59	1.11
12	Farm technologies developed by AAU are more advantageous.	1.54	1.06
13	AAU is the ultimate source to solve farmers' problems.	1.75	1.02
14	Publication of AAU farm literature are worthwhile to solve farmer's field problems.	1.39	1.14

Administering the scale

The final scale measures the attitude of farmers towards Anand Agricultural University using 14 statements on a five-point continuum from 'Strongly agree' to 'Strongly disagree' with weighted score of 5,4,3,2 and 1 for positive and reverse to negative statements. Respondents received a score ranging from 14 to 70. Using an arbitrary classification method, respondents were categorized into five categories.

S.No.	Categories	Score
1	Strongly unfavorable	Up to 14
2	Unfavorable	14.01 to 28
3	Neutral	28.01 to 42
4	Favorable	42.01 to 56
5	Strongly favorable	Above 56.00

CONCLUSION

The scale's development and standardisation aim to promote research into the behavioural aspects of Anand Agricultural University. Scale product method was used to develop the attitude scale, wherein 33 statements were initially drafted. After the refinement made by experts and criteria, 26 statements were retained. Further, based on the S value and Q value, the statements were refined to 14 (11 positive statements and 3 negative statements). The developed tool has a reliability coefficient of 0.827, which may be described as highly consistent and thus usable in a variety of scenarios. These findings establish the utility of the scale in measuring farmer attitudes in future studies. As such, researchers may consider utilizing this scale to measure farmer attitudes towards similar institutions or domains.

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