**DEVELOPMENT OF A SCALE TO MEASURE THE ENTREPRENEURIAL ATTITUDE ORIENTATION OF AGRICULTURE STUDENTS**

**ABSTRACT**

Entrepreneurial Attitude Orientation (EAO) is a multi-dimensional construct that plays a vital role in shaping the entrepreneurial behaviour and career choices of agriculture students. As entrepreneurship emerges as a viable alternative to traditional employment in the agricultural sector, assessing students’ attitudes becomes crucial for effective policy planning and educational interventions. However, attitude being a latent psychological trait, cannot be measured directly through a single indicator. This necessitates the development of a standardized and valid scale to assess entrepreneurial attitude orientation among agriculture students. In the present study, a reliable instrument was developed using the Equal-Appearing Interval Scale method. An initial pool of 80 attitude statements related to entrepreneurship was generated through literature review and student interviews. These items were refined based on Edward’s criteria and subjected to evaluation by a panel of experts from Agricultural Universities, ICAR institutions, and entrepreneurship training centres. Based on judges’ ratings, a final scale comprising 10 attitude statements was selected, ensuring content validity, a wide and uniform distribution along the psychological continuum, high scale values, low Q-values, and a balanced representation of favourable and unfavourable items. The resulting Entrepreneurial Attitude Orientation Scale (EAOS) is a standardized tool with potential applications in academic assessments, entrepreneurship training programmes, and policy-level decision-making in agricultural education.

**Key words:** Entrepreneurship, Equal-Appearing Interval Scale, Agriculture Students.

**1. INTRODUCTION**

Entrepreneurship has emerged as a critical pathway for sustainable economic development, rural employment generation, and inclusive growth, especially in the agricultural sector. In recent decades, traditional employment opportunities in agriculture have become saturated and less attractive to youth, particularly in rural areas. As a result, there has been an increasing emphasis on promoting agripreneurship, a form of entrepreneurship in agriculture to empower young graduates to become job creators rather than job seekers (World Bank, 2019).

Entrepreneurship in agriculture not only diversifies income sources but also promotes innovation in farming, value addition, agri-processing, and marketing. It contributes significantly to rural development, gender equity, and technological adoption. Governments and institutions like TNAU, Entrepreneurship Development and Innovation Institute (EDII), NABARD, MSME, MANAGE, DIC etc. have launched numerous schemes to support aspiring entrepreneurs (GOI, 2021). However, despite such institutional support, the uptake of entrepreneurship as a career option among agriculture students remains limited. Recent studies have also shown that agriculture students’ perception of the startup ecosystem and entrepreneurial support environment significantly affects their attitude toward entrepreneurship and self-employment opportunities (Chatterjee & Ghosh, 2023).

One of the primary reasons is the underlying **attitude** of students toward entrepreneurship, which significantly influences their intentions and behaviours. Attitude is a complex psychological construct influenced by individual personality traits, socio-cultural factors, and educational exposure. It cannot be measured by a single variable but requires a comprehensive assessment through a standardized tool (Ajzen, 1991, Kumar & Bansal, 2021). Multidimensional factors such as personal motivation, innovation capacity, and risk-taking ability are known to influence agripreneurship among Indian youth (Kumar & Bansal, 2021), making the development of a reliable attitude scale critical. Assessments of entrepreneurial readiness among final-year agricultural students in Tamil Nadu have revealed that while awareness levels are moderate, attitude and motivation vary significantly, indicating the need for standardized measurement tools (Narayanan & Ravi, 2022).

In this context, there is a need to scientifically measure the entrepreneurial attitude orientation of final-year agriculture students to understand their readiness, motivation, and perception towards entrepreneurship. Therefore, the present study was designed with the objective of developing a standardized and valid scale to measure the Entrepreneurial Attitude Orientation (EAO) of agriculture students using established psychometric procedures.

**2. METHODOLOGY**

The Entrepreneurial Attitude Orientation Scale (EAOS) was developed using the Equal-Appearing Interval scaling technique as originally proposed by Thurstone and Chave (1927). An initial pool of 80 attitude statements related to entrepreneurship was generated through an extensive review of literature, informal discussions with entrepreneurship trainers, faculty members of Agricultural Universities, experts from EDII, ICAR institutes, and through personal observations and interaction with students.

The drafted statements were carefully reviewed and edited according to the 14 informal criteria prescribed by Edwards (1957) to ensure clarity, one-dimensionality, relevance, and neutrality. Special care was taken to balance favourable and unfavourable items, and to avoid ambiguous or leading statements. After editing, 60 statements were retained from the original 80.

The 60 attitude statements were formatted on a five-point continuum ranging from ‘Most Unfavourable’ to ‘Most Favourable’ with the score of 5, 4, 3, 2, 1 respectively and reverse for the negative statements were sent by Google form survey, by post and handed over personally to the total of 60 judges. The judges comprise the experts from State Agricultural Universities, ICAR Research Institutes, and entrepreneurship development organizations. A total of 30 valid responses were received in time and used for further analysis. While the Thurstone EAI method is well-established (Thurstone & Chave, 1929), recent innovations have further improved its efficiency. For instance, Symeonaki et al. (2024) demonstrated that integrating AI with traditional judge-based scaling can reduce labor while retaining scale accuracy. Additionally, Sathyapriya and Asokhan (2020) successfully applied the same methodology in an agricultural context to develop a farmer attitude scale in Tamil Nadu using expert panels—underscoring the technique’s suitability for studies like EAOS.

The universe of statements related to the entrepreneurship attitude orientation is presented in the Table 1.

**Table 1: Universe of statements related to the entrepreneurship attitude orientation**

|  |  |
| --- | --- |
| **S. No.** | **Statements** |
|  | I believe I can become a successful entrepreneur. |
|  | I like taking challenges that push me to perform better. |
|  | I prefer to set high standards for my personal and professional achievements. |
|  | I often doubt my ability to start and manage a business. |
|  | I often seek new ways to improve existing agricultural practices. |
|  | I regularly attend events or programs related to entrepreneurship. |
|  | I intend to join a startup or create one of my own after graduation. |
|  | I feel satisfied only when I achieve something through my own efforts. |
|  | I set personal deadlines to ensure I meet my goals. |
|  | I take calculated risks after evaluating possible outcomes. |
|  | I take pride in achieving success through hard work. |
|  | I am persistent and do not give up easily on tasks I start. |
|  | I push myself to perform better than before in every task. |
|  | I am willing to take risks to start something new. |
|  | I remain calm and focused when faced with risky situations. |
|  | I think creativity is essential for success in agribusiness. |
|  | I believe risks are opportunities for success. |
|  | I am comfortable making decisions with incomplete information. |
|  | I feel excited about uncertain outcomes in business. |
|  | I am working to gain the skills required to run a business. |
|  | I am open to trying unconventional approaches, even if they involve risk. |
|  | I often fear failure, even if the idea seems promising. |
|  | I do not hesitate to invest time or resources in uncertain ventures. |
|  | I stay motivated even when my business ideas are risky. |
|  | I believe facing risk is essential for entrepreneurial growth. |
|  | I rarely come up with creative ideas to solve problems. |
|  | I feel satisfied when I discover an original solution to a problem. |
|  | I am interested in creating something different from others. |
|  | I am motivated by the desire to accomplish something valuable in life. |
|  | I enjoy trying out untested methods and solutions. |
|  | I regularly think about how to make things more efficient or better. |
|  | I prefer experimenting over following traditional approaches. |
|  | I believe innovation is a key factor in business success. |
|  | I come up with unique ideas even when not asked to. |
|  | I enjoy observing how others solve problems creatively. |
|  | I get excited when I find new ways to use available resources. |
|  | I always set goals and work hard to achieve them. |
|  | I prefer to create jobs rather than seek one. |
|  | I do not let fear stop me from pursuing my goals. |
|  | I can lead a team with confidence and clarity. |
|  | I strive to complete tasks even when they are difficult or time-consuming. |
|  | I usually take initiative without waiting for directions. |
|  | I remain confident even when others doubt my ideas. |
|  | I can handle criticism without losing self-belief. |
|  | I often feel unsure when I need to make business decisions. |
|  | I trust my instincts when starting a new project. |
|  | I can take independent decisions without relying heavily on others. |
|  | I believe I can turn my ideas into reality. |
|  | I want to become an entrepreneur after graduation. |
|  | I believe that no great success comes without taking some risk. |
|  | I follow successful entrepreneurs as role models. |
|  | I enjoy competing with others and emerging successful. |
|  | I often think about business ideas that could be successful. |
|  | I plan to start my own enterprise within the next five years. |
|  | I search for opportunities that can lead to a business venture. |
|  | I cannot convince others to support my business idea. |
|  | I feel excited about the idea of being my own boss. |
|  | I do not see myself starting a business in the near future. |
|  | I speak clearly and confidently when presenting new ideas. |
|  | I would rather take a risk and start a business than choose a secure job. |

(MUF- Most Unfavourable; UF- Unfavourable; N- Neutral; F-Favourable; MF- Most Favourable)

**2.1. Calculations of Scale and Q values**

The data obtained from 30 subjects for each statement are arranged in table as frequency and proportions in the first and second row respectively. The proportions are obtained by dividing each frequency by the total number of subjects. The ‘S’ and ‘Q’ values given in scale were judged based on 30 respondent’s opinion and equal appearing interval which were computed by calculating the median value (S) and their inter quartile range (Q). The objective was to have small number of statements evenly placed on the continuum. The median value is considered as scale value and it was calculated by using following formula.

S=𝑙+ 0.50−Σ𝑃𝑏 𝑃𝑤 i

Where,

S = the median or scale value

l = the lower limit of the interval in which the scale value falls

Pb = the sum of the proportion below the interval in which the scale value falls

Pw = the proportion within the interval in which the scale value falls

l = the width of the interval and it is assumed to be equal to 1.00

Q = C75- C25

Q = inter quartile range; C75 = 75th centile; C25 = 25th Centile

25th centile = C25= 𝑙 + 0.25−Σ𝑃𝑏 𝑃𝑤 i

75th centile = C75 = *l* + 0.75−Σ𝑃𝑏 𝑃𝑤 i

When there is good agreement among the subjects in judging the degree of favourableness of a statement, Q value will be small. A large Q value indicates disagreement among the judges as to the degree of attribute possessed by a statement and it is, therefore, taken as an indication that there is some ambiguity in the statement. Thurstone & Chave (1929) regard large Q values primarily as an indication that a statement is ambiguous. It is also may be since statement is interpreted in more than one way by the subjects.

**2.2. Reliability of the scale**

Reliability refers to the consistency of scores obtained by the same individuals when re-examined with the test on different occasions, or with different sets of equivalent items Anastasi (1968). The reliability of the scale was determined by ‘split – half’ method. The test is divided into two halves in which one half contains the odd-numbered items (1,3,5,7,9) and other half contains the even-numbered items (2,4,6,8,10). A single administration of the two sets of items to a sample of respondents, yields two sets of scores. A positive and significant correlation between the two sets of scores indicates that the test is reliable.

From the self-correlation of the half-tests, the reliability coefficient of the whole test may be estimated by the Spearman-Brown formula, as follows.

Reliability coefficient of the whole test = 2×reliability coefficient of the half test

1+reliability coefficient of the half test.

**3. FINDINGS AND DISCUSSION**

Based on the calculation, Individual statements with S and Q values are presented in Table 2.

**Table 2:** Computation of Equal Appearing Interval Scale

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S. No.** | **Statement**  **No.** | **‘Q’**  **value** | **Scale**  **value** | **Difference between**  **Successive ‘Scale’ Value** | **Cumulative**  **value** | **Interval** | **Compartments** |
|  | 14 | -4.00 | 9.50 | -9.50 | -2.50 | 0.70 | I |
|  | 32 | 0.89 | 2.50 | 0.00 | 0 |
|  | 4 | 3.13 | 2.70 | 0.13 | 0.33 |
|  | 3 | 2.68 | 2.83 | 0.17 | 0.50 |
|  | 36 | 2.40 | 3.00 | 0.00 | 0.50 |
|  | 53 | 3.09 | 3.00 | 0.13 | 0.62 |
|  | 37 | 2.19 | 3.13 | 0.04 | 0.67 |
|  | 43 | -0.44 | 3.17 | 0.17 | 0.83 | 1.40 | II |
|  | 13 | 1.44 | 3.36 | 0.00 | 0.86 |
|  | 31 | 0.89 | 3.36 | 0.00 | 0.86 |
|  | 34 | 1.83 | 3.36 | 0.00 | 0.86 |
|  | 40 | 1.76 | 3.36 | 0.14 | 1.00 |
|  | 41 | -0.11 | 3.63 | 0.00 | 1.23 |
|  | 47 | 0.31 | 3.63 | 0.00 | 1.41 | 2.10 | III |
|  | 48 | 1.56 | 3.63 | 0.04 | 1.47 |
|  | 50 | 2.15 | 3.63 | 0.00 | 1.59 |
|  | 39 | 2.13 | 3.63 | 0.07 | 1.70 |
|  | 49 | 1.85 | 3.90 | 0.04 | 1.84 |
|  | 10 | -0.47 | 4.00 | 0.06 | 1.90 |
|  | 30 | 1.55 | 4.00 | 0.00 | 2.05 |
|  | 12 | 1.34 | 4.10 | 0.07 | 2.15 | 2.80 | IV |
|  | 1 | 1.54 | 4.17 | 0.17 | 2.23 |
|  | 18 | 0.18 | 4.33 | 0.00 | 2.25 |
|  | 52 | 1.37 | 4.33 | 0.17 | 2.30 |
|  | 22 | -4.25 | 4.50 | 0.00 | 2.33 |
|  | 23 | 0.75 | 4.50 | 0.00 | 2.54 |
|  | 27 | 0.67 | 4.50 | 0.00 | 2.70 |
|  | 29 | -0.08 | 4.50 | 0.00 | 2.90 | 3.50 | V |
|  | 42 | 1.30 | 4.50 | 0.00 | 3.10 |
|  | 44 | 1.69 | 4.50 | 0.00 | 3.20 |
|  | 24 | -0.43 | 4.67 | 0.00 | 3.29 |
|  | 2 | 1.43 | 4.75 | 0.08 | 3.33 |
|  | 16 | -4.18 | 4.75 | 0.07 | 3.40 |
|  | 7 | -0.32 | 4.90 | 0.00 | 3.60 | 4.20 | VI |
|  | 38 | 0.20 | 4.90 | 0.10 | 3.77 |
|  | 45 | -0.43 | 5.10 | 0.00 | 3.90 |
|  | 57 | -0.58 | 5.10 | 0.00 | 4.00 |
|  | 5 | 0.00 | 5.17 | 0.07 | 4.17 |
|  | 19 | 1.48 | 5.17 | 0.13 | 4.20 |
|  | 35 | -3.85 | 5.30 | 0.20 | 4.30 | 4.90 | VII |
|  | 8 | 0.00 | 5.45 | 0.00 | 4.35 |
|  | 11 | -2.18 | 5.48 | 0.00 | 4.40 |
|  | 26 | 0.00 | 5.49 | 0.00 | 4.55 |
|  | 46 | 0.91 | 5.50 | 0.00 | 4.70 |
|  | 59 | 0.90 | 5.50 | 0.00 | 4.79 |
|  | 17 | 1.33 | 5.50 | 0.25 | 5.15 | 5.60 | VIII |
|  | 51 | -0.43 | 5.75 | 0.00 | 5.25 |
|  | 55 | -4.18 | 5.87 | 0.00 | 5.40 |
|  | 56 | -4.18 | 6.00 | 0.17 | 5.57 |
|  | 58 | 1.31 | 6.00 | 0.33 | 5.60 |
|  | 33 | 0.67 | 6.50 | 0.00 | 6.00 | 6.30 | IX |
|  | 9 | -0.69 | 6.83 | 0.00 | 6.23 |
|  | 20 | -3.33 | 6.83 | 0.00 | 6.23 |
|  | 54 | -0.58 | 6.83 | 0.00 | 6.25 |
|  | 60 | -0.43 | 6.83 | 0.00 | 6.28 |
|  | 21 | -4.25 | 7.17 | 0.00 | 6.47 | 7.00 | X |
|  | 28 | 0.00 | 7.17 | 0.33 | 6.50 |
|  | 25 | 0.00 | 7.50 | 1.50 | 6.70 |
|  | 15 | -3.18 | 9.00 | 0.00 | 7.00 |
|  | 6 | -3.73 | 9.50 | -9.50 | 7.00 |

**3.1. Item selection**

The final attitude items were selected based on the universe of content, uniform distribution of scale values along with the psychological continuum and high ‘scale values and smaller ‘Q’ values and equal number of favourable and unfavourable attitude items. The scale values were arranged in descending order of magnitude and the difference between the successive scale values and the cumulative total of the computed differences were worked out. Since the selected scale values should have equal appearing interval and distributed uniformly along the psychological continuum it was necessary to form ten compartments to select ten statements with one statement from each of the compartment. The basis for forming the compartments was that, each compartment should be equally spaced in the continuum. For this purpose, the cumulative value (7.00) was divided by ten, which worked out to 0.70 and this formed the width of the first-class interval. The second interval was worked out by adding the value with the width of the first-class interval. Subsequently all the ten intervals were worked out and presented in Table 3.

**Table 3: Computation of class interval values**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Compartments** | **Interval values** |
|  | I | 0.70 |
|  | II | 0.70 + 0.70 = 1.40 |
|  | III | 1.40 +0.70 = 2.10 |
|  | IV | 2.10 + 0.70 = 2.80 |
|  | V | 2.80 + 0.70 = 3.50 |
|  | VI | 3.50 + 0.70 = 4.20 |
|  | VII | 4.20 + 0.70 = 4.90 |
|  | VIII | 4.90 + 0.70 = 5.60 |
|  | IX | 5.60 + 0.70 = 6.30 |
|  | X | 6.30 + 0.70 = 7.00 |

To select the attitude items from the ten compartments the “scale values” and the corresponding ‘Q’ values were considered. Based on the criteria already mentioned items having high ‘scale values” and low ‘Q' values were selected with one item from each compartment. Care was taken to ensure that the selected items represented the universe of content and covered the different aspects of conservation agriculture. Thereby ten items were selected with equal appearing interval and with a uniform distribution along the psychological continuum. The attitude scale thus constructed is given in Table 4.

**Table 4: Selected Attitude Statements**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S. No.** | **Item No.** | **Statements** | **S value** | **Q value** | **Nature of statement** |
|  | 37 | I always set goals and work hard to achieve them. | 2.19 | 3.13 | Favourable |
|  | 41 | I strive to complete tasks even when they are difficult or time-consuming. | -0.11 | 3.63 | Favourable |
|  | 10 | I take calculated risks after evaluating possible outcomes. | -0.47 | 4.00 | Favourable |
|  | 22 | I often fear failure, even if the idea seems promising. | -4.25 | 4.50 | Unfavourable |
|  | 16 | I think creativity is essential for success in agribusiness. | -4.18 | 4.75 | Favourable |
|  | 5 | I often seek new ways to improve existing agricultural practices. | 0.00 | 5.17 | Favourable |
|  | 59 | I speak clearly and confidently when presenting new ideas. | 0.90 | 5.50 | Favourable |
|  | 56 | I cannot convince others to support my business idea. | -4.18 | 6.00 | Unfavourable |
|  | 20 | I am working to gain the skills required to run a business. | -3.33 | 6.83 | Favourable |
|  | 6 | I regularly attend events or programmes related to entrepreneurship. | -3.73 | 9.50 | Favourable |

**3.2. Scale Reliability**

The reliability of the scale was determined by ‘split – half’ method. The ten selected attitude items were divided into two equal halves by odd even method. The two halves were administered separately to 30 in a non-sampling students. The scores were subjected to correlation test to find out the reliability of the half test by using SPSS software. The half-test reliability coefficient (r) was 0.638 which was significant at one per cent level of probability. Further the reliability coefficient of the whole test was computed using the Spearman-Brown Prophecy formula. The whole test reliability (rtt) was 0.778. When the purpose of the test is to compare the mean scores of two groups of narrow range a reliability coefficient of 0.50 or 0.60 would suffice. Hence, the constructed scale is reliable as the reliable coefficient (rtt) was >0.60.

**3.3. Content Validity of the Scale**

Content validation was carried out by subjecting the selected ten items to judge’s opinion. The judges were requested to indicate their presumed relevance to which the attitude items covered the different aspects of conservation agriculture practices. The responses were obtained on a four-point continuum of ‘most adequately covered’, ‘more adequately covered’, ‘less adequately covered’ and ‘least adequately covered’. Scores of 4, 3, 2 and 1 were given for the points on the continuum respectively. Totally 30 judges responded by sending their judgments. The mean score 2.5 was fixed as the basis for deciding the content validity of the scale. If the overall mean score of the attitude items as rated by the judges was above 2.5 the scale will be declared as valid and if not otherwise. In the present case the overall mean score was worked out as 3.94 and therefore the constructed attitude scale is said to be valid.

**3.4. Administration of the Scale Value**

The ten attitude items selected were arranged randomly to avoid biased responses. The scale was administered on a five-point continuum as strongly agree, agree, undecided, strongly disagree and disagree. The score obtained for each statement was summed up to arrive at the attitude score for the respondents. The score ranged from 50 (maximum) to 10 (minimum). Maximum score revealed a favourable attitude, while a minimum score indicated unfavourable attitude towards entrepreneurship. The responses were grouped as unfavourable, moderately favourable, and highly favourable based on the cumulative frequency method.

In conclusion, there are various methods available for construction of an attitude scale, Equal Appearing Interval method scaling technique was used in this study to measure the attitude of farmers towards conservation agriculture practices. The scale would be highly useful to study the attitude of conservation agriculture

**4. CONCLUSION**

In conclusion, various scaling techniques are available for the construction of attitude measurement tools; among these, the Equal Appearing Interval (EAI) method was utilized in this study to develop a standardized scale to assess the Entrepreneurial Attitude Orientation (EAO) of Agriculture students. The scale comprises valid and reliable statements that reflect students’ predispositions, motivations, and behavioural inclinations toward entrepreneurship. This scale can serve as an effective tool for identifying entrepreneurial potential, designing targeted training programs, and evaluating the impact of entrepreneurship development interventions in agricultural universities and institutions.

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1.

2.

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