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Measuring entrepreneurial learning behaviour among the tribal farmers of north-east, India: A scale development study

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Abstract

The study set out to develop a scale to measure entrepreneurial Learning Behaviour (LB) in individuals, focusing on their learning patterns around agri-entrepreneurial activities. The goal was to emphasize the importance of active involvement and address the needs of individuals for fostering entrepreneurship. Using Thurstone's Equal Appearing Interval Scale Technique, the scale was designed and tested for reliability and validity, showing strong results statistically reliable at 0.855 and a mean score of 3.53, both surpassing the necessary benchmarks. The scale assesses learning behaviour across three key areas: Cognitive, Affective, and Psychomotor domains, with three statements for each. Participants respond on a five-point scale—Strongly Agree, Agree, Disagree, Strongly Disagree, and Undecided—with favourable responses weighted 5 to 1, and unfavourable responses weighted 1 to 5. While the LB scale was initially developed with insights from experts in the Anini and Anjaw districts of the Mishmi Hills in Arunachal Pradesh, India, it's designed to be flexible and adaptable. It can be applied in various regions, states, and sectors, making it a valuable tool for promoting entrepreneurship in different contexts.

Keywords: Learning behaviour scale, tribal farmers, Mishmi hills, Arunachal Pradesh, northeast India, Thurstone equal-appearing interval scaling technique

Introduction

Many nations globally have recently recognized entrepreneurship as a critical area for advancing long-term economic objectives, with India being a prominent example (Jindal and Bhardwaj, 2016) [4]. Entrepreneurship is viewed as a key driver of the country's economic growth (Garga and Bagga, 2009) [3]. In India, the government has undertaken various initiatives to foster entrepreneurship development across different states (Jindal and Bhardwaj, 2016) [4]. Special attention has also been directed toward the Northeastern region, aiming to boost entrepreneurial activity by leveraging the region's abundant agro-climatic and natural resources (Walia and Darlong, 2023) [14].

The Northeast region of India consists of eight states: Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim. The majority of the population, primarily tribal, relies on agriculture and land-based activities for their livelihood. In Arunachal Pradesh, a predominantly tribal state, around 3.64 lakh individuals fall within the 15-29 age group, with most either pursuing education or seeking employment (Census, 2011) [2]. Given the state's favourable climate for horticulture and fruit cultivation, spanning 0.08 million hectares (SAPCC, 2011) [10], promoting entrepreneurship, particularly in agri-entrepreneurship, could be an effective solution to address unemployment.

Various studies indicate that institutions in the state have actively encouraged the tribal population to engage in agri-entrepreneurship through capacity-building and skill training programs conducted at the state, district, and village levels (Mongjam *et al*. 2024) [7]. However, despite the critical role of entrepreneurship in driving economic development in the Northeastern region (Marak *et al*. 2024) [6] and the substantial efforts by the government and state institutions, sources reveal contradictory findings (Swarupa and Choudhury, 2023) [12]. The tribal population in the region continues to show limited success in entrepreneurial ventures within the agricultural and allied sectors (Oniya, 2024) [8].

This underperformance in the region, necessitates the experts to encourage and engage at individual level to take proactive measures. Entrepreneurship can be viewed as an individual-centered creativity (Stevenson *et al*. 2024) [11], based upon their learning behaviour. The learning behaviour of an individual plays a crucial role in shaping their decision to take up entrepreneurship and their success as an entrepreneur. Individuals with a growth mindset believe that abilities and intelligence can be developed through effort, learning, and persistence. This mindset encourages experimentation, resilience, and risk-taking—traits crucial for entrepreneurship. While those with a fixed mindset may avoid challenges and risks, as they believe their abilities are static. This can hinder their willingness to pursue entrepreneurial ventures, where failure and learning from mistakes are common. Learning behaviour is fundamental to entrepreneurship because it affects how individuals approach challenges, acquire necessary skills, adapt to change, and pursue learnings from trainings. Entrepreneurs who prioritize adapting the learnings from trainings and growth are more likely to succeed in the ever-evolving business environment.

Consequently, the study sought to develop practical scale to assess entrepreneurial Learning Behaviour (LB) at the individual level, which would aid in measuring individuals' LB and aim to enhance the entrepreneurial action in region.

Materials and Methods

Equal-appearing Interval Scaling Technique (Thurstons Scale)

Scaling of items has been widely used among the researchers through Equal-appearing Interval method (Raahalya *et al*. 2024) [9]. The scale was developed by Thurstone as a substitute for direct application of comparative judgement, hence the scale is also popularly known and Thurstone Scale.

For the study, scale development process followed steps originally developed by Thurstone and Chave (Thurstone, 1946) [13]: Item pooling, Subjects/Judges were asked to sort the items evenly from extreme to other series of attitudes, opinions poorly judged were eliminated, frequency of each item were analyzed, Scale Value (S-value) and Inter-quartile Value (Q-value) was determined for each items selected. S-value is considered as the point above and below 50 per cent where the judgment lies for each item and therefore, it is taken as the median value, Whereas, Q-value indicates the extent of variation on judgements made on the selected items around the S-value. Items with high S-values and low Q-values were retained from each compartment for scale development (Wedayanti *et al*. 2016) [15].

Item pooling

Statements were gathered through literature reviews representing the behavioural construct of entrepreneurial LB, and expert opinions were considered. A total of 30 items were amassed and subsequently structured into items. These items were put under screening using informal criteria proposed by Edwards, 1969 (Birch, 1987) [1] for refining the items intended for inclusion in the development of the LB scale.

Data Computation and Factorization of the selected Items

The defined items were forwarded to 60 judges. The list of items was requested to be reviewed and judge each item at five-point continuum: strongly agree, agree, disagree, strongly disagree and undecided with corresponding score of 5, 4, 3, 2 and 1 respectively and experts' responses were recorded. Each response was further analyzed using factor analysis to evaluate the mutual relationships among the measurement items and identify the underlying theoretical constructs within the dataset. The indicator items underwent a rigorous investigation and validation process, ensuring overall quality of the measuring instrument being developed.

Item selection and computation of Scale values and Interquartile values

Further the expert responses were undertaken for LB scale development and the median, centile value (at 0.25, 0.50 and 0.75) and interquartile (Q) range for each item was computed with the given below equation 1, 2 and 3 respectively.

$$S = l + \frac{(0.5-\sum pb)}{pw} \times i. \text{ ------- } \textit{equation-1}$$

Where, S = scale value of the item, l = lower limit of the interval where the median falls, ∑pb = sum of proportions below the category where median falls, and i = width of the category.

$$C_x = l + \frac{X-\sum pb}{pw} \times i \text{ -------- } \textit{equation-2}$$

Where, C_x = indicates the centile value (0.25/0.5 or 0.75), l = lower limit of the interval in which X^{th} centile value falls, ∑pb = indicates sum of the proportion below the X^{th} centile value and *I*= indicates the width of sorting category.

$$Q = C_{75} - C_{25} \text{ ------------- } \textit{equation-3}$$

Where, Q = interquartile value, C_{75} = centile value at 0.75 and C_{25} = centile value at 0.25.

The scale items to be included in the scale were additionally checked against Thrustone given below criteria.

The items chosen should encompass the entire spectrum of the content relevant to the entrepreneurial action in agricultural and allied sector.

The scale value assigned to the selected item should be uniformly distributed along the behavioral continuum ensuring equal appearing intervals.

While selection of item prioritizing the item with high 'S-value' and smaller 'Q-value' is recommended as far as possible.

The criteria include maintaining of relatively equal number of items reflecting positive and negative behavior, whenever possible.

The outlined criterions were considered during the development of an objective technique for selecting EA items and to determine the difference between successive scale values and the cumulative total of all calculated differences, the scale values were arranged in descending order of magnitude.

Selection of the Study Area

Two Districts: Dibang Valley District and Anjaw District of Mishmi Hills were selected purposively for the study in Arunachal Pradesh, India. As researcher is familiar with the area and language provided communication advantage.

From the selected districts a total of 60 experts were involved in the study, including Agricultural development officers, horticultural development officers, subject matter specialists and field experts of agricultural and allied sectors who are directly or indirectly involved in entrepreneurship endeavors of farmers. Data recorded from each response were organized, checked and omitted to assure the consistency and validity.

Results and Discussion

Before advancing the development of a scale to measure LB at individual level, a preliminary step was taken to understand the program pattern organized by institution for entrepreneurship development in the selected study area. It was noted that several trainings on capacity and skill building programs was conducted. However, these programs did not consider the measuring the LB of farmers involved in entrepreneurial trainings. This oversight may be a significant reason for slow or limited growth in entrepreneurship in the region, highlighting a tendency to prioritize understanding the LB of farmers over addressing individual needs. Thus, it is essential to develop a scale that can assess LB at individual level to foster effective entrepreneurship development.

Factor Formation

Exploratory factor analysis method was considered for the study to improve the clarity of data and decrease the risk of information. During the process varimax rotation was employed to maximize the variance of loadings in component matrices; improving the coefficient clarity and KMO-MSA test and Bartlett's test were paid attention. Kaiser-Meyer-Olkin Measure of Sample Adequacy (KMO-MSA) test and Bartlett's test were performed together for all the data set and 0.66 was the observed value (Table 1); which is greater than the critical value (0.50), indicating the sample is sufficient for factor analysis.

Table 1: KMO-MSA Test and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.66
Bartlett's test of Sphericity Approx. Chi-Square	923
df	435
Sig.	0.000

Additionally, Bartlett's Test of Significance for the dataset was also found to be statistically significant with a value of 0.000 (Table 1), which below the threshold value: 0.05. Consequently, the completion of two preliminary test supports to proceed with factor analysis for the study.

The subsequent steps involved the examination and assessment of items for data reduction. During the process, command items with eigen value greater or equal to 1 and those contributing more than 30 per cent (0.30) to the variance were deemed sufficient to explain the variability within the factor.

From Table 2 it can be seen that variability among the 30 items were reduced to form 3 factors, named as per Blooms Taxonomy hierarchical order; cognitive domain, affective domain and psychomotor domain, representing different stages of learning behaviour.

Table 2: Domains of learning behaviour scale at individual level

Domains	Characteristics
Cognitive Domain	This domain focuses how individuals process information and apply it to improve their understanding and problem-solving abilities
Affective Domain	This relates to how a person feels about learning tasks, how motivated they are, and how much they are willing to invest emotionally in the process
Psychomotor Domain	This domain emphasizes the role of physical practice in skill acquisition through repetition and improvement.

Thurstone Equal-appearing Interval Scaling Technique

A total of 30 items finalized for the scale, with three items representing each domain of LB (Table 3), were carefully chosen to reflect equal intervals on attitude continuum. To ascertain the discrepancy between consecutive scale values and the total cumulative difference of all computed variances, the scale values were organized in descending order of magnitude. Nine statements were chosen to compose the LB scale, taking into consideration respondents' time constraints.

To maintain an even distribution of scale values across LB domains, three compartments were established within each domain. The aim was to select one item from each compartment to determine the potential values of the scale. These compartments within individual domains were intended to be evenly spaced along the continuum. The decision to create three compartments stemmed from the necessity to choose three statements under each domain, each representing a distinct segment of the spectrum. In total, nine statements were considered for the LB scale. The objective was to ensure consistent spacing between compartments across the continuum. The width of the class interval for each domain was calculated by dividing the total number of statements in each domain: cognitive domain, affective domain and psychomotor domain resulting in widths of 0.77, 0.511 and 0.388 respectively. Each class interval served as a compartment for the selection of LB items.

The selection of LB attitude items from the three compartments, from each domain took into account both the scale values and their corresponding Q values (Table 3). Items with high S values and low Q-values were considered from each compartment according to the criteria. These chosen items were selected thoughtfully to ensure they addressed similar and different aspects of learning behaviour of a respondent. Consequently, nine items were selected, each demonstrating a uniform distribution across the psychological continuum and an equal interval of appearance. The resulting attitude scale is presented below.

Table 3: Final item selected with corresponding scale value and Q value

S. No.	Scale value	Q value	Items	Nature of Item
Cognitive Domain				
1	3.07	2.08	I can list out the key components from teaching	Positive
2	3.96	1.09	I am unable to enumerate my learnings	Negative
3	4.75	1.40	I haven't applied what I have learnt	Negative
Affective Domain				
1	2.41	1.43	The session I attended had no specific base	Negative
2	3.07	2.25	I had some queries on expert views	Positive
3	3.78	2.07	Now I need to rethink over my plan	Positive
Psychomotor Domain				
1	3.00	2.29	I can perform what I learnt anywhere without hesitation	Positive
2	3.60	2.23	I am unable to formulate new learnings	Negative
3	4.16	1.27	I failed to adhere the instruction provided	Negative

Attention was paid to ensure that the chosen items covered a wide array of tribal farmer learning behaviour in agricultural and allied sector. Considering each items contributing to a balanced distribution across the behavioural continuum and equal appearing intervals. The resulting LB scale is detailed below (Table 4), along with the Table 5 illustrates the scoring procedure to be followed for the developed EA scale.

Table 4: Learning behaviour scale at individual level

Domains	Characteristics
Cognitive Domain	I can list out the key components from teaching
	I am unable to enumerate my learnings
	I haven't applied what I have learnt
Affective Domain	The session I attended had no specific base
	I had some queries on expert views
	Now I need to rethink over my plan
Psychomotor Domain	I can perform what I learnt anywhere without hesitation
	I am unable to formulate new learnings
	I failed to adhere the instruction provided

Table 5: Scoring Procedure

Nature of the Statement	Continuum				
	Strongly Agree	Agree	Disagree	Strongly disagree	Undecided
Positive	5	4	3	2	1
Negative	2	3	4	5	1

Reliability of Learning Behavior Scale

The scale's reliability was assessed using the split-half method. The nine selected attitude items were split into two halves using the odd-even method. These halves were then administered separately to 30 respondents in a non-sample area. The scores obtained were analysed using a product-moment correlation test to determine the reliability of the half-test. The reliability coefficient (r) for the half-test was found to be 0.581, which was statistically significant at five percent level of probability. Additionally, the Spearman-Brown Prophecy method was computed for reliability coefficient, resulting in a reliability coefficient of 0.855. If the mean scores of the two groups falls within a narrow range, a reliability coefficient of 0.50 or 0.60 is considered sufficient. Therefore, since the constructed scale's reliability rating exceeded 0.60, the developed LB scale was considered reliable.

Content Validity of Learning Behavior Scale

Content validation refers to assessing the adequacy of the content within a measuring scale (Kerlinger, 1973) [5] for the study, content validation was conducted by soliciting the opinions of judges on the selected nine attitude items under LB scale. These experts in the selected study area were asked to evaluate the extent to which each attitude item covered various domains of learning behaviour. Experts provided their ratings on a five-point scale ranging from "Strongly agree," "Agree," "Disagree," "Strongly disagree," and "Undecided," with scores of 5, 4, 3, 2, and 1 assigned respectively. A total of 30 experts participated and provided their judgments. The mean score of 2.5 was established as the benchmark for determining the content validity of the scale. If the overall mean score of the LB items rated by the experts exceeded 2.5, the scale would be considered valid; otherwise, it would not be deemed valid. In the study, the overall mean score calculated was 3.53, indicating that the LB scale adequately covered the domains of learning behaviour. Therefore, the constructed LB scale was deemed valid.

Administration of Learning Behaviour Scale among the tribal farmers of Mishmi Hills

Given that learning behaviour is a dynamic and ongoing process, the LB scale was applied to tribal farmers in the Mishmi Hills. Approximately 300 participants were chosen from a specific district in the region, and their learning behaviour at the time of the survey was assessed across three domains: cognitive, affective, and psychomotor.

From the Figure 1 it can be observed that in the cognitive domain, majority of the respondents (45.66%) exhibited an above average level, while 39.66 per cent of respondents displayed average category within the affective domain, and most respondents demonstrated an average level in psychomotor domain. Additionally, overall learning behavior was analyzed as presented in the Table 6, which clearly indicates that majority (48.33%) of the respondents exhibited average level of learning behavior, while 48 per cent of respondents exhibited below average level and only 3.67 per cent of respondents displayed above average level of learning behavior.

These results may be attributed to respondents' frequent social interaction with experts through trainings, which contributed to their average performance. Whereas, financial constraints and inadequate environmental conditions for establishing enterprises limited respondents' ability to apply their learnings practically.

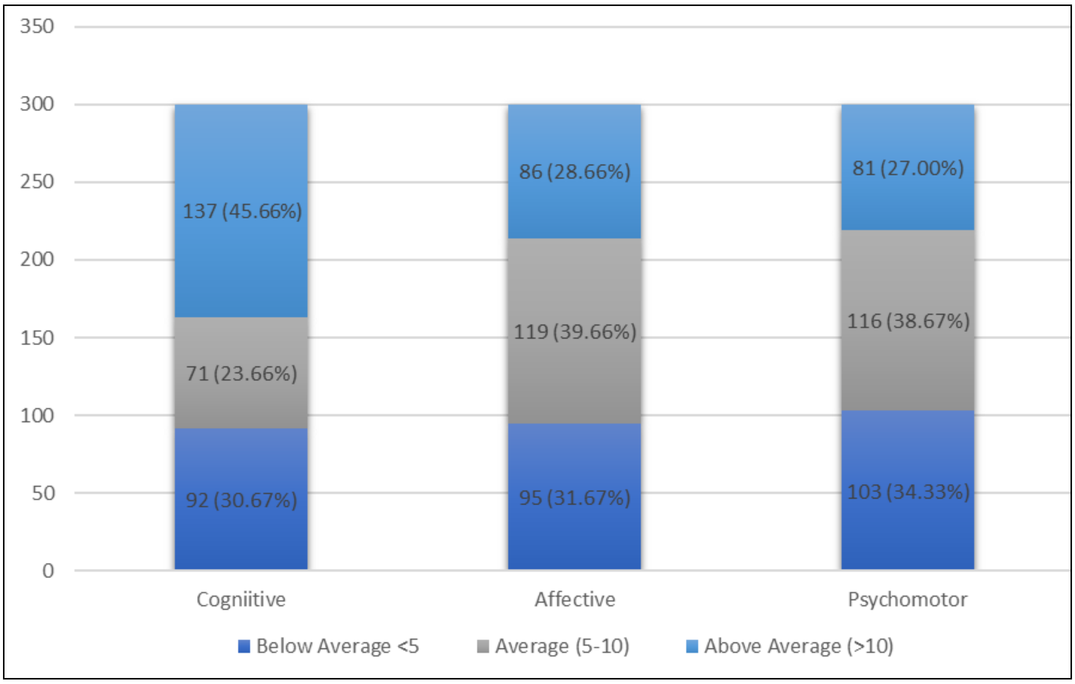

Fig 1: Distribution of respondents based on three domains of learning behavior

Table 6: Distribution of respondents based on their learning behavior (n=300)

S. No.	Category (Score)	Total No. of respondents (n=300)	Total percentage (%)
1	Below average (<15)	144	48.00
2	Average (15-30)	145	48.33
3	Above average (>30)	11	3.67
Total		300	100

Conclusion

Learning behavior refers to actions and attitude of an individuals that shows in their pursuit of acquiring knowledge, retaining skills learnt and to what extent he learnt skill is applied. This motivates one's curiosity and willingness to actively engage in learning process, whether through hands-on activities or applying new knowledge in practical situations. Through a review of previous literature and primary sources, this study highlighted the importance of learning behaviour (LB). A key contribution is the development of a reliable and valid scale using the Equal-Appearing Interval Scaling technique to measure LB across three domains: Cognitive, Affective, and Psychomotor. The scale's accuracy in capturing different stages of LB was ensured through a careful selection process and thorough statistical validation. This LB scale will help assess individuals' engagement in capacity building and skill development, significantly supporting entrepreneurship development goals by informing the design of effective training programs to address entrepreneurial failures, among the tribal farmers of Mishmi Hills in Arunachal Pradesh, India.

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Conflict of Interest

The authors declare no conflict of interest.

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