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A PSYCHOMETRIC REVALIDATION OF THE CREATIVITY FOSTERING TEACHER BEHAVIOUR SCALE IN INDIA

Azono Nakhro¹ and Dr. Rashmi²

¹Research Scholar, Department of Teacher Education, Nagaland University ²Assistant Professor, Department of Teacher Education, Nagaland University

1 Corresponding Author: Dr Rashmi

2 Department of Teacher Education, Nagaland University, Kohima Campus, Meriema: 797004 Email: rashmipranay06@gmail.com

Abstract

This study aimed to revalidate the Creativity Fostering Teacher Behaviour Index (CFT Index) developed by Soh (2000) within the Indian educational context, specifically among elementary school teachers in Nagaland. The research followed a quantitative methodology, employing Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to assess the construct validity and reliability of the scale. A total sample of 431 elementary teachers was selected using a multi-stage stratified random sampling technique. EFA supported a six- factor structure namely, Independent Thinking (IT), Supportive Environment (SE), Encouraging Student Autonomy (ESA), Student-Centered Learning (SCL), Inquiry-Based Learning (IBL), Participation and Extension (PAE) which is nearly consistent with the original scale. The study provides empirical support for its application in teacher evaluation, professional development, and educational policy implementation in line with NEP 2020 objectives. Confirmatory Factor Analysis (CFA) further affirmed the model's goodness-of-fit, with satisfactory indices indicating structural validity. Reliability analysis showed high internal consistency across all subscales. The findings confirm the suitability of the CFT Index for measuring creative teaching behaviours in the Indian context, offering valuable implications for teacher development, educational research, and policy implementation.

Keywords: Creativity Fostering Teacher Behaviour, CFT Index, Psychometric Revalidation, NEP 2020, Factor Analysis, Elementary Education.

Introduction:

As the global landscape undergoes rapid transformation, its inhabitants must equip themselves to engage in presently uncharted roles and address several emerging environmental, economic, and social challenges (World Economic Forum, 2020). Consequently, 21st-century competences, including creativity, seek to cultivate civic and professional prospects in ambiguous environments (Beghetto, 2019). Creativity denotes the capacity to generate novel and suitable ideas or products via many cognitive processes, including divergent and convergent thinking (Sternberg and Lubart, 1995). Creativity is essential for addressing difficult issues through the integration of divergent thinking (concept production) and convergent thinking (idea selection), while also fostering perseverance to produce tangible results (Grohman et al., 2017; Lille and Romero, 2017; Sharma & Sharma, 2018).

Creativity offers substantial advantages for both individuals and society; hence, the enhancement of students' creative abilities has rightly garnered much focus from policymakers, professionals, and researchers in recent years. Fostering creativity in the classroom has become essential for educators worldwide, as policy documents and school curriculum in numerous countries, including India, identify it as a significant desired student outcome (Craft, 2010; Heilmann & Korte, 2010; Shaheen, 2010).

NEP 2020 also emphasises the cultivation of creativity in individuals. Creativity is not solely an individual capacity; it may also be cultivated (Nijstad and de Dreu, 2002). The effective cultivation of creativity in school is predominantly contingent upon teachers (Bereczki & Kárpáti, 2018). Encouraging pupils' creativity through creativity-enhancing behaviours has become an essential ability for teachers in 21st century. Teachers exhibiting creativity-enhancing behaviours can cultivate a dynamic instructional environment and facilitate the development of essential cognitive and emotional abilities in the students.

Numerous data gathering instruments exist for assessing student creativity. Recently in 2025 Swaminathan and Rathnasabapathy has revalidate the scale developed by Field and Bischoff (2013) to measure creativity in young adults. However, there is a scarcity of tools designed to evaluate teachers' creativity-fostering practices. Soh (2015) noted that Cropley (1997) identified nine conditions essential for teachers to cultivate student creativity, as follows:

- 1. Autonomy: Promoting individual learning among pupils;
- 2. Integration: Employing a collaborative, socially inclusive pedagogical approach;
- 3. Motivation: Encouraging students to acquire factual knowledge to establish a robust foundation for diverse thinking;
- 4. Judgement: Postponing the evaluation of students' ideas until they have been meticulously developed and clearly articulated;
- 5. Flexibility: Promoting adaptable cognition;
- 6. Assessment: Encouraging self-assessment among students;
- 7. Inquiry: Valuing students' recommendations and enquiries.
- 8. Opportunities: Providing students with the chance to engage with diverse materials and under various settings; and
- 9. Frustration: Assisting students in developing resilience in the face of frustration and failure, there by fostering the confidence to explore the novel and unconventional.

Utilising these as the conceptual foundation, Soh (2000) created the Creativity Fostering Teacher Behaviour Index (CFT Index) to address the deficiency of appropriate instruments for assessing teacher behaviour pertinent to the aforementioned principles. In developing Soh's (2000) CFT Index, the nine principles for encouraging creativity in teacher conduct, as proposed by Cropley (1997), were operationalised through teacher-student interactions.

For each of the nine principles, five items were written to illustrate teacher behaviours in the classroom that align with each concept. Numerous researchers have referenced and utilised it for diverse objectives related to creativity development, including assessing the efficacy of creativity enhancement initiatives, examining the cross-cultural validity of its translated iterations, and employing it as a primary tool for doctoral dissertations (Soh, 2015). Soh asserts that the CFT Index has successfully served its intended purpose by supplying creativity researchers with an essential data collection tool. The publications are dispersed across many sources in the forms of journal papers, research monographs, and PhD theses.

In line with that, again, the present article is another effort to revalidating the CFT Index developed by soh (2000) in Indian Context. The researcher has used the all items as it was mentioned in the tool and administered on the elementary teachers of Nagaland state in India. The researcher applied Exploratory factor analysis (EFA) and Confirmatory factor analysis (CFA) for the dimension reduction and item analysis based on the data collected from the sample. The reliability of the items was also checked to determine the potential items which can explain the teacher's behaviour in fostering the creativity. For checking the reliability, Cronbach Alpha, Composite Reliability (CR), Average Variance Extracted (AVE) and split half method with odd and even items were performed. SPSS software version 29.0 has been used to analyse the data.

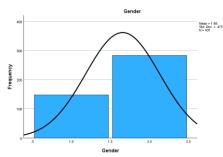
Sample distribution and test of normality:

The total sample size used for item analysis and other validation process was 431. The elementary teachers were selected through stratified random sampling technique, keeping in mind all the demographic variables as gender, educational qualification, professional qualification (trained or untrained), teaching experience, locale and the school management. The detail description of the sample are as follows. In the total sample of 431, the representation of

- gender was 148 (male) and 283 (female);
- educational qualification was 277 (graduate) and 154 (post graduate and above);
- professional qualification was 308 (trained) and 123 (untrained);

- teaching experience was 124 (0-5 years), 130 (6-10 years), 87 (11-15 years), 44 (16-20 years), 33 (21-25 years), and 13 (26 years and above);
- locality was 268 (urban) and 163 (rural) and
- management of school was 212 (government) and 219 (private).

Fig 1 to 6 represents the sample distribution through histogram. Table 1 to table 6 represents the normality testing for the demographic variable based on the Kolmogorov-Smirnova and Shapiro-Wilk test of normality which shows that samples are normally distributed and it is true representative of the population.



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Fig (1): Gender

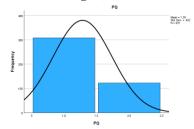


Fig (2): Educational qualification

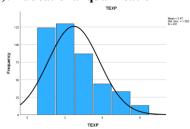
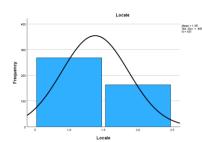


Fig (3): Professional Qualification (Trained or Untrained) Fig (4): Teaching Experience



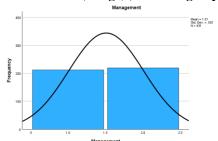


Fig (5): Locality of the institution

Fig (6): Management of the school

Table 1: Tests of Normality for gender

	Kolmogorov-Smirnov ^a S				Shapiro-Wi	Shapiro-Wilk		
	Gender	Statistic	df	Sig.	Statistic	df	Sig.	
Total	Male	.064	148	.200*	.983	148	.060	
	Female	.056	283	.034	.989	283	.026	

^{*.} This is a lower bound of the true significance.

Table 2: Tests of Normality for educational qualification

	Education	Kolmogorov-Smirnov ^a			Shapiro-Wilk			
	qualification	Statistic	df	Sig.	Statistic	df	Sig.	
Total	Graduate	.044	277	.200*	.989	277	.041	
	PG and above	.060	154	.200*	.992	154	.545	

^{*.} This is a lower bound of the true significance.

Table 3: Tests of Normality

	Professional	Kolmogorov-Smirnov ^a		Shapiro-Wilk			
	Qualification	Statistic	df	Sig.	Statistic	df	Sig.
Total	Trained	.046	308	.200*	.989	308	.024
	Untrained	.062	123	.200*	.979	123	.052

^{*.} This is a lower bound of the true significance.

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Table 4: Tests of Normality

	Teaching	Kolmogoro	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Experience	Statistic	df	Sig.	Statistic	df	Sig.	
Total	0-5 years	.067	124	.200*	.982	124	.093	
	6-10 years	.088	130	.016	.982	130	.084	
	11-15 years	.078	87	.200*	.986	87	.504	
	16-20 years	.056	44	.200*	.982	44	.696	
	21-25 years	.081	33	.200*	.964	33	.325	
	26 and above	.206	13	.135	.871	13	.054	

^{*.} This is a lower bound of the true significance.

Table 5: Tests of Normality

		Kolmogorov-Smirnov ^a S			Shapiro-W	Shapiro-Wilk		
	Locale	Statistic	df	Sig.	Statistic	df	Sig.	
Total	Urban	.040	268	.200*	.989	268	.033	
	Rural	.055	163	.200*	.989	163	.247	

^{*.} This is a lower bound of the true significance.

Table 6: Tests of Normality

		Kolmogorov-Smirnov ^a			Shapiro-Wi	Shapiro-Wilk		
	Management	Statistic	df	Sig.	Statistic	df	Sig.	
Total	Government	.051	212	.200*	.990	212	.135	
	Private	.041	219	.200*	.989	219	.103	

^{*.} This is a lower bound of the true significance.

Exploratory factor analysis (EFA) of the scale:

Exploratory factor analysis (EFA) was employed on the total 45 items developed by Soh (2000) and 21 items were deleted step wise based on the factor loading and double loading. At last following results has been found by the researcher.

Table 7: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy856						
Bartlett's Test of Sphericity	Approx. Chi-Square	2800.425				
	df	276				
	Sig.	<.001				

Based on table 7, Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was found .856. This value is excellent (values above 0.80 are considered great). It suggests that the dataset is well-suited for factor analysis.

Bartlett's Test of Sphericity:

Chi-Square Value for the test was found 2800.425 at the Degrees of Freedom (df) 276 which is Significant at .001 level of significance. The significant p-value (< 0.001) confirms that the correlation matrix is not an identity matrix, meaning that factor analysis is appropriate.

Item wise factor loading:

Table 8 explains the factor loading for each item.

a. Lilliefors Significance Correction

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Table 8: item wise factor loading

	1	Table 8: item wise factor loading	T
S.No.	S.No. by Soh (2015)	Items developed by Soh (2000)	Factor loading
1	2	"In my class, students have opportunities to share ideas and views."	.566
2	3	"Learning the basic knowledge/skills is emphasized in my class."	.578
3	4	"When my students have some ideas, I get them to explore further before I take a stand."	.756
4	5	"In my class, I probe students' ideas to encourage thinking."	.705
5	24	"My students know that I expect them to check their own work before I do."	.402
6	16	"When my students have questions to ask, I listen to them carefully."	.812
7	17	"When my students put what they have learnt into different uses, I appreciate them."	.797
8	18	"I help students who experienced failure to cope with it so that they regain their confidence."	.630
9	31	"I comment on students' ideas only after they have been more thoroughly explored."	.494
10	32	"I like my students to take time to think in different ways."	.477
11	33	"In my class, students have opportunities to judge for themselves whether they are right or wrong."	.673
12	34	"I listen to my students' suggestions even if they are not practical or useful."	.739
13	35	"I don't mind my students trying out their own ideas and deviating from what I have shown them."	.697
14	15	"I provide opportunities for my students to share their strong and weak points with the class."	.421
15	39	"Covering the syllabus is <i>not</i> more important to me than making sure the students learn the basics well."	.733
16	40	"I encourage students to do things differently although doing this takes up more time."	.740
17	41	"I allow students to deviate from what they are told to do."	.561
18	8	"I encourage my students to try out what they have learned from me in different situations."	.628
19	10	"I teach my students the basics and leave them to find out more for themselves."	.738
20	19	"I leave questions for my students to find out for themselves."	.705
21	29	"I encourage students to ask questions and make suggestions in my class."	.432
22	30	"Moving from one topic to the next quickly is <i>not</i> my main concern in class."	.504
23	42	"I allow my students to show one another their work before submission."	.558
24	44	"Students are allowed to go beyond what I teach them within my subject."	.687

Table 9: Rotated Component Matrix^a

	Component								
	1	2	3	4	5	6			
Item2		.566							
Item3		.578							
Item4		.756							
Item5		.705							
Item24		.402							
Item16			.812						
Item17			.797						
Item18			.630						
Item31	.494								

Item32	.477			
Item33	.673			
Item34	.739			
Item35	.697			
Item15			.421	
Item39			.733	
Item40			.740	
Item41			.561	
Item8		.628		
Item10		.738		
Item19		.705		
Item29				.432
Item30				.504
Item42				.558
Item44				.687

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.^a

a. Rotation converged in 8 iterations.

Table 9 shows the rotated component matrix for the item loaded together after running EFA. The factor loading of the item is not same as explained by the Soh (2000) which was based on the nine (9) conditions of Cropley (1997). The item loaded differently in the groups based on the collected data. Thus, researcher tried to name the dimensions based on the loading of different items which is as follows:

Table 10: Name of the dimension based on the items loaded together

S.No	Factors	Name of Dimensions	Item numbers as per Soh (2015)
1	Factor 1	Independent Thinking (IT)	2, 3, 4, 5, 24
2	Factor 2	Supportive Environment (SE)	16, 17, 18
3	Factor 3	Encouraging Student Autonomy (ESA)	31, 32, 33, 34, 35
4	Factor 4	Student-Centered Learning (SCL)	15, 39, 40, 41
5	Factor 5	Inquiry-Based Learning (IBL)	8, 10, 19
6	Factor 6	Participation and Extension (PAE)	29, 30, 42, 44

Confirmatory factor analysis (CFA):

After the EFA, CFA has been employed to the result for the confirmation of the factor loading through AMOS software. The results of CFA are as follows:

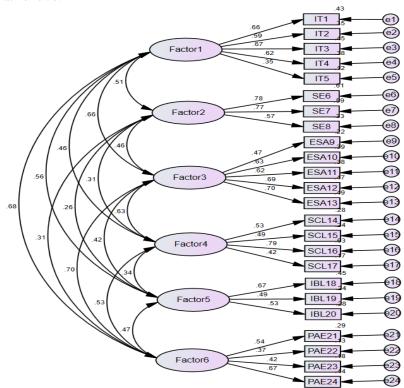


Fig: Result of CFA for the items developed by Soh (2000)

Table 11 and 12 shows the regression weights and standardized regression weights for each item and all the items are significantly affecting factors associated with that. Table 10 shows the correlations between the factors/dimensions.

Table 11: Regression Weights

			Estimate	S.E.	C.R.	P	Label
IT1	<	Factor1	1.000				
IT2	<	Factor1	.830	.081	10.180	***	par_1
IT3	<	Factor1	1.053	.101	10.461	***	par_2
IT4	<	Factor1	1.003	.102	9.837	***	par_3
IT5	<	Factor1	.738	.121	6.104	***	par_4
SE6	<	Factor2	1.000				
SE7	<	Factor2	1.034	.081	12.788	***	par_5
SE8	<	Factor2	.907	.091	9.943	***	par_6
ESA9	<	Factor3	1.000				
ESA10	<	Factor3	1.109	.135	8.188	***	par_7
ESA11	<	Factor3	1.324	.167	7.916	***	par_8
ESA12	<	Factor3	1.387	.167	8.290	***	par_9
ESA13	<	Factor3	1.582	.187	8.470	***	par_10
SCL14	<	Factor4	1.000				
SCL15	<	Factor4	1.170	.181	6.463	***	par_11
SCL16	<	Factor4	1.383	.190	7.284	***	par_12
SCL17	<	Factor4	1.079	.172	6.262	***	par_13
IBL18	<	Factor5	1.000				
IBL19	<	Factor5	1.150	.205	5.619	***	par_14
IBL20	<	Factor5	.943	.163	5.802	***	par_15
PAE21	<	Factor6	1.000				
PAE22	<	Factor6	1.497	.270	5.545	***	par_16
PAE23	<	Factor6	1.597	.279	5.725	***	par_17
PAE24	<	Factor6	2.289	.311	7.357	***	par_18

Table 12: Standardized Regression Weights

		uizeu iteg	Estimate
IT1	<	Factor1	.656
IT2	<	Factor1	.595
IT3	<	Factor1	.668
IT4	<	Factor1	.620
IT5	<	Factor1	.350
SE6	<	Factor2	.780
SE7	<	Factor2	.769
SE8	<	Factor2	.574
ESA9	<	Factor3	.466
ESA10	<	Factor3	.627
ESA11	<	Factor3	.615
ESA12	<	Factor3	.688
ESA13	<	Factor3	.702
SCL14	<	Factor4	.526
SCL15	<	Factor4	.487
SCL16	<	Factor4	.793
SCL17	<	Factor4	.417
IBL18	<	Factor5	.668
IBL19	<	Factor5	.494
IBL20	<	Factor5	.532
PAE21	<	Factor6	.536
PAE22	<	Factor6	.366
PAE23	<	Factor6	.423
PAE24	<	Factor6	.666

Table 13: Correlations:

		Estimate
Factor1 <>	Factor2	.506
Factor1 <>	Factor3	.663
Factor1 <>	Factor4	.457
Factor1 <>	Factor5	.556
Factor6 <>	Factor1	.685
Factor2 <>	Factor3	.464
Factor2 <>	Factor4	.312
Factor2 <>	Factor5	.259
Factor6 <>	Factor2	.311
Factor3 <>	Factor4	.626
Factor3 <>	Factor5	.422
Factor6 <>	Factor3	.704
Factor4 <>	Factor5	.345
Factor6 <>	Factor4	.525
Factor6 <>	Factor5	.467

Although each item (developed by Soh, 2000) was having the high communalities but only 24 items were loaded correctly during employing the EFA. Again, the result of the CFA shows that only 24 items among the 45 items are having the strong potential to test and explain the teacher's behaviour to foster the creativity in Indian context. The **Confirmatory Factor Analysis (CFA)** further supported this factor structure. Fit indices such as CFI (.824), TLI (.777), and RMSEA (.067) all fell within acceptable ranges, indicating that the model provided a good fit to the observed data. These results suggest that the factor structure of the original scale is largely replicable in the Indian context, with minimal modifications required. **Reliability of the scale:**

After the confirmation of the items and factors, reliability testing has been done by the researcher. Cronbach's alpha, AVE (Average Variance Extracted), CR (Composite Reliability) and split-half method was employed on the scale. A Cronbach's α value of 0.70 or more was considered to reflect good internal consistency (Sijtsma, 2009; Hair et al., 2010). The present study shows the value of 0.836 and value of 0.858 for Cronbach's Alpha Based on Standardized Items which shows that the scale is having good internal consistency (table 14).

Table 14: Reliability Statistics

	Cronbach's	Alpha	
	Based	on	
Cronbach's Alpha	Standardized It	ems	N of Items
.836	.858		24

The average variance extracted (AVE) and composite reliability (CR) of the scale were investigated for convergent validity. The AVE and CR for the overall scale is 0.407 and. 0.940 respectively. If the mean variance is below than 0.5 and the composite reliability is above than 0.6, the construct has acceptable convergent validity (Fornell & Larcker, 1981). These findings are fulfilling the criteria and prove that the convergent validity of the scale has been achieved (table 15).

Table 15: Average Variance Extracted (AVE) and Composite Reliability (CR) of the scale

S.No	Factors	Name of Dimensions (given by the	AVE	CR
		researcher)		
1	Factor 1	Independent Thinking (IT)	0.38	0.744
2	Factor 2	Supportive Environment (SE)	0.564	0.793
3	Factor 3	Encouraging Student Autonomy (ESA)	0.391	0.757
4	Factor 4	Student-Centered Learning (SCL)	0.479	0.733
5	Factor 5	Inquiry-Based Learning (IBL)	0.394	0.713
6	Factor 6	Participation and Extension (PAE)	0.306	0.631
7		Overall Scale with 24 items	0.407	0.940

Internal consistency of the scale had been checked by the split-half method by considering the correlation between the odd and even item.

Table 16: Correlations between odd and even items

		ODDitems	EVENitems
ODDitems	Pearson Correlation	1	.734**
	Sig. (2-tailed)		<.001
	N	431	431
EVENitems	Pearson Correlation	.734**	1
	Sig. (2-tailed)	<.001	
	N	431	431

^{**.} Correlation is significant at the 0.01 level (2-tailed).

The value of Correlation between odd and even items is .734 (table 16) and is significant at 0.01 level of significance, which shows the high correlation between odd and even item showing the high internal consistency of the scale.

Discussion:

The present study aimed to psychometrically revalidate Soh's (2000) *Creativity Fostering Teacher Behaviour Index* (*CFT Index*) within the Indian context, specifically among elementary teachers in Nagaland. The findings, supported by both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), provide evidence for the scale's reliability and construct validity in this new cultural and educational setting.

The results of the EFA revealed a clear factor structure that closely aligns with the original dimensions of the CFT Index—namely, *Independent Thinking (IT)*, *Supportive Environment (SE)*, *Encouraging Student Autonomy (ESA)*, *Student-Centered Learning (SCL)*, *Inquiry-Based Learning (IBL)*, *Participation and Extension (PAE)*. However, some items showed cross-loadings or weaker loadings than in Soh's original validation study, suggesting potential cultural and contextual influences. For instance, items that implied extensive curricular deviation or risk-taking behaviours were more cautiously endorsed, which may reflect the constraints of the Indian education system where teachers often work within tightly prescribed curricula and standardized expectations.

CFA further confirmed a good model fit for the restructured scale. This reinforces the factorial validity of the scale in the Indian context and indicates that the underlying constructs of creative teaching behaviour are generally consistent across cultures, although their manifestations may differ due to systemic or pedagogical norms. The scale also demonstrated high internal consistency reliability (Cronbach's alpha > .80 across most subscales), affirming its robustness for measuring creative teaching behaviour among Indian educators.

A notable contribution of this study is the cultural contextualization of creative teaching. Indian teachers often navigate challenges like rigid syllabi, examination pressures, and limited resources. Despite these constraints, the positive response patterns on the scale suggest a growing inclination among teachers in Nagaland to adopt creative approaches in their classrooms, possibly influenced by educational reforms such as the National Education Policy (NEP) 2020, which emphasizes experiential, multidisciplinary, and learner-centric teaching.

These findings hold practical significance for teacher education programs and policy formulation. Teacher training institutions in India could benefit from integrating the validated scale into their assessment and professional development modules to identify and nurture creative teaching competencies. Additionally, education administrators may use the scale to support evidence-based strategies aimed at enhancing teaching innovation within the classroom.

This study contributes to the growing body of psychometric validation research in Indian education by providing a reliable and contextually appropriate instrument to assess creative teaching behaviour. It also opens up possibilities for large-scale teacher assessments, targeted professional development, and school-based interventions aimed at fostering creativity in the classroom.

However, the study is not without limitations. The sample, although diverse within Nagaland, may not fully represent the heterogeneity of the Indian teaching population. Moreover, while quantitative techniques such as EFA and CFA provide statistical validation, future research could incorporate qualitative feedback from teachers to enrich understanding of the contextual barriers and enablers of creative teaching in India.

The revalidated CFT Index scale demonstrates strong psychometric properties in the Indian context and offers a reliable tool for assessing creative teaching behaviour. This study not only affirms the cross-cultural relevance of creative teaching constructs but also underlines the need for systemic support to cultivate and sustain creativity in Indian classrooms.

Conclusion:

In conclusion, the psychometric revalidation of the *Creativity Fostering Teacher Behaviour Index (CFT Index)* demonstrates its efficacy as a reliable and valid instrument for assessing creative teaching practices within the Indian educational landscape. The study's methodological rigor and cultural sensitivity contribute significantly to the field, providing educators, researchers, and policymakers with a robust tool to evaluate and enhance creative teaching behaviours.

Future research can be explored the application of this scale across diverse educational settings and levels to further establish its generalizability. Additionally, longitudinal studies could provide insights into how creative teaching behaviours evolve over time and impact student outcomes. By continuing to refine and adapt such instruments, the educational community can better support and promote creativity in teaching practices.

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