INTERNATIONAL RESEARCH JOURNAL OF HUMANITIES AND INTERDISCIPLINARY STUDIES
(Peer-reviewed, Refereed, Indexed & Open Access Journal)
DOI : 03.2021-11278686 ISSN : 2582-8568 IMPACT FACTOR : 8.031 (SJIF 2025)

"Impact of Thinking Styles on Problem-Solving: A Comparative Study of Cooperative and Individual Learning Approaches"

Prof. Shashi Bala Trivedi
HOD,
Teacher - Education Department,
Shri Varshney College,
Aligarh (Uttar Pradesh, India)
E-mail: shashibalatrivedi@gmail.com

DOI No. 03.2021-11278686 **DOI Link ::** https://doi-ds.org/doilink/09.2025-66494759/IRJHIS2509005

ABSTRACT:

The present study investigates the Impact of Thinking Styles on Problem-Solving: A Comparative Study of Cooperative and Individual Learning Approaches.Employing a quasi-experimental design, seventy-two learners were assessed on general mental ability, divergent thinking, English language achievement, differential aptitude, and social acceptability. Two groups were formed: a Cooperative Learning Group (CLG) exposed to the Team-Games-Tournament (TGT) method, and an Individualistic Learning Group (ILG) instructed through traditional techniques. Data were analysed using mean, standard deviation, t-tests, and ANOVA. Results reveal that although pre-test scores did not significantly differ, post-test analyses indicated that CLG learners significantly outperformed ILG learners in English achievement, differential aptitude, and social acceptability. Convergent and divergent thinking abilities exerted significant influence on learning outcomes, with cooperative learning proving particularly effective in enhancing creativity, linguistic problem-solving, and social adjustment. The findings highlight the pedagogical value of cooperative learning strategies in fostering holistic learner development.

KEYWORDS: *Cooperative Learning, Individualistic Learning, Convergent Thinking, Divergent Thinking, Problem-Solving, English Achievement, Social Acceptability*

1. INTRODUCTION:

Data analysis represents a critical stage of empirical research, transforming raw scores into meaningful insights. Without interpretation, data remain inert, offering little contribution to the advancement of knowledge. The interpretation of organized information enables researchers to uncover both established and novel patterns. Particularly in education, analysis reveals the broader implications of teaching-learning interventions on learners' cognitive and affective outcomes (Best & Kahn, 2006).

This paper presents the analysis and interpretation of data collected in a study on the **"Impact of Thinking Styles on Problem-Solving: A Comparative Study of Cooperative and Individual Learning Approaches"** In contemporary pedagogical discourse, cooperative learning methods such as the Team-Games-Tournament (TGT) approach are widely acknowledged for promoting interaction, motivation, and achievement (Slavin, 1995; Johnson & Johnson, 2009). Conversely, individualistic learningoften aligned with traditional methodsremains prevalent, emphasizing independent problem-solving.

The present study addresses two critical questions:

i. How do convergent and divergent thinking abilities influence English language problem-solving in different instructional settings?

ii. What is the relative effectiveness of cooperative versus individualistic learning on academic performance, differential aptitude, and social acceptability?

2. METHODOLOGICAL OVERVIEW:

A total of seventy-two learners were purposively sampled and distributed into two instructional groups: Cooperative Learning Group (CLG) and Individualistic Learning Group (ILG). The CLG received instruction through the TGT cooperative learning method, while ILG was taught using traditional approaches.

2.1. Instruments:

- **Convergent Thinking Ability:** General Mental Ability Group Test (R.K. Tandon).
- **Divergent Thinking Ability:** Divergent Production Ability Test (K.N. Sharma, 1987).
- **Academic Achievement:** English language achievement test (self-constructed).
- **Differential Aptitude:** Standardized differential aptitude scale.
- **Social Acceptability:** Peer-assessment sociometric scale.

2.2. Data Analysis: Descriptive and inferential statistics (mean, SD, t-test, ANOVA, and two-way ANOVA) were used to assess differences across groups and treatment conditions.

3. RESULTS:

3.1. Baseline Equivalence of Groups: Pre-test analysis confirmed no significant differences between CLG and ILG in convergent and divergent thinking (Tables 1–5). Both groups demonstrated comparable starting points, ensuring fair experimental conditions.

Table No. 1

'F'-Value of the Learners' Convergent Thinking Test Score ofCLG group and ILG group

Source of Variation	Degree of freedom (DF)	Residuals		'F'-value	'p'-value	Level of significance
		Sum of Squares(SS)	Mean Squares(MS)			

Between Groups	1	15.125	015.125	0.12394	0.725859	0.05 level Not significant
Within Groups	70	8542.5278	122.0361			
Total	71	8728.4444				

Table No 2

'F'-Value of the Learners' 'Divergent Thinking' Test Score of CLG group and ILG group

Source of Variation	Degree of freedom (DF)	Residuals		'F'-value	'p'-value	Level of significance
		Sum of Squares (SS)	Mean Squares (MS)			
Between Groups	1	210.125	210.125	0.55551	0.458569	0.05 level Not significant
Within Groups	70	26477.75	378.2536			
Total	71	26687.875				

Table No. 3

Distribution of Mean Scores Obtained for Convergent and Divergent Thinking Level of theSelected Sample for CLG group and ILG group

Independent variable	Group	N	Mean	S.D.	't'-value	Level of Significance
Convergent Thinking	CLG group	18	44.28	14.69	0.171	0.05 level Not significant
	ILG group	18	45.11	14.49		
Divergent Thinking	CLG group	18	67.94	20.83	0.04	0.05 level Not significant
	ILG group	18	67.66	18.41		

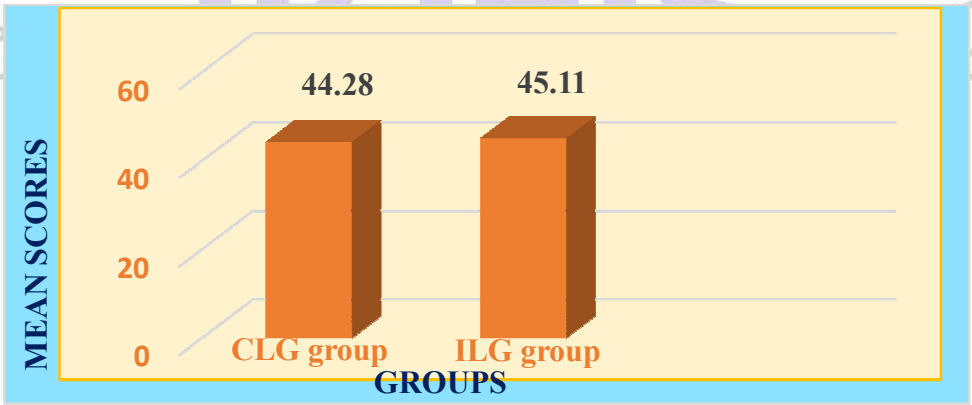

Fig. 1 Distribution Mean Scores in Convergent Thinking Ability Levels for CLG group & ILG group

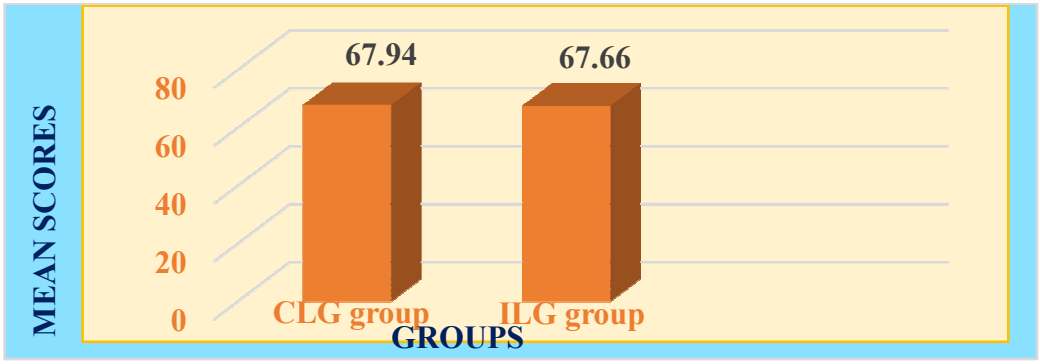

Fig. 2 Distribution Mean Scores in Divergent Thinking Ability Levels For CLG group and ILG group

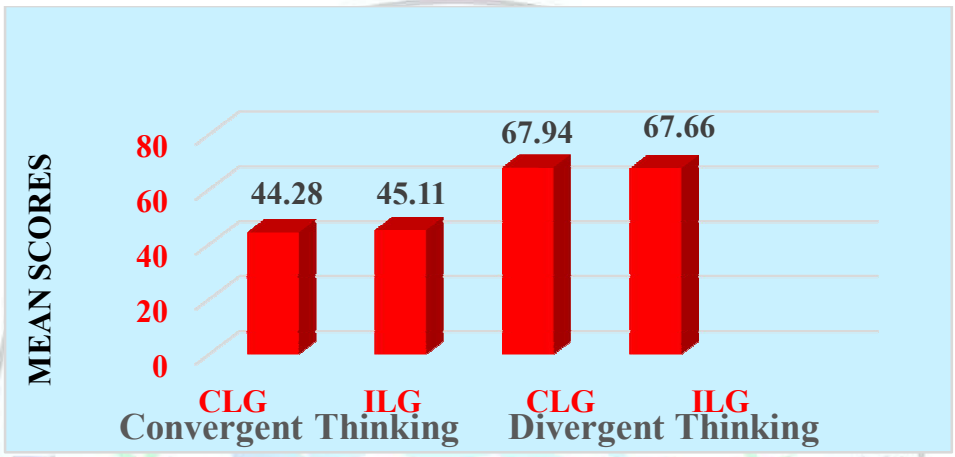

Fig. 3 Distribution Mean Scores in Convergent Thinking Levels & Divergent Thinking Levels for CLG group and ILG group

3.2. Effect of Convergent Thinking on English Achievement: Pre-test scores indicated no significant differences (t = 0.34, ns). Post-test scores, however, revealed a significant difference, with CLG learners (M = 50.33) outperforming ILG learners (M = 41.61), $t = 2.32$, $p < 0.05$. Gain scores further confirmed CLG's superiority ($t = 12.02$). Thus, cooperative learning significantly enhanced convergent thinking influence on English achievement.

Table No. 4

't'-Value for Difference in the Pre-Test Mean Scores of the Learners' Convergent Thinking Influence on English Achievement of CLG group & ILG group

Round	Group	N	Mean	S.D.		't'-value	Level of significance
Pre-Test	CLG group	18	37.88	7.28		0.34	0.05 level Not significant
	ILG group	18	39.00	11.39			

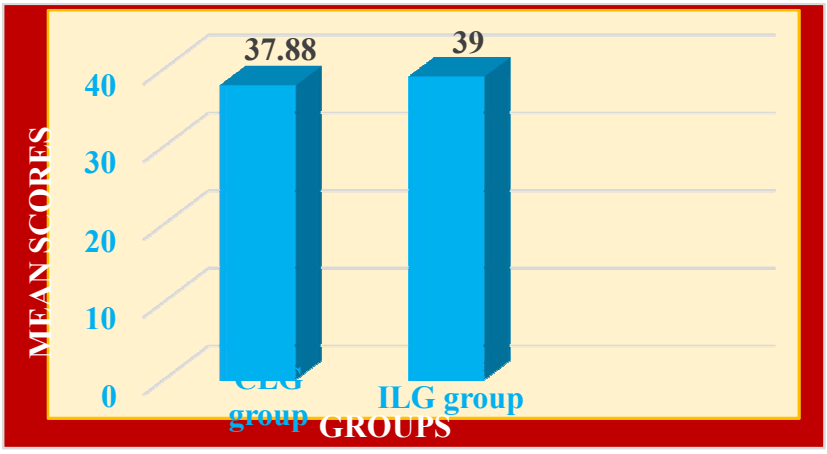

Fig. No. 4 Pre - Test Mean Scores of the Learners' Convergent Thinking Influence on English Achievement of CLG group & ILG group

Table No.5

't'-Value for Difference in the Post-Test Mean Scores of the Learners' Convergent Thinking Influence on English Achievement ofCLG group & ILG group

Round	Group	N	Mean	S.D.	't'-value	Level ofsignificance
Post-test	CLG group	18	50.33	10.73	2.32	0.05 level significant
	ILG group	18	41.61	11.78		

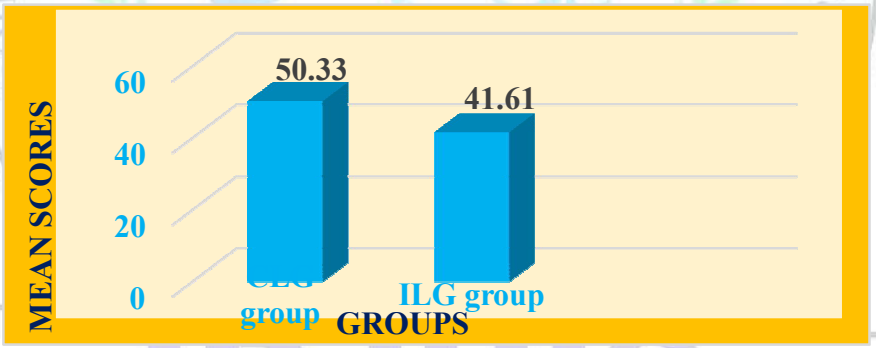

Fig. No. 5 Post-Test Mean Scores of the Learners' Convergent Thinking Influenceon English Achievement of CLG group and ILG group

Table No.6

't'-Value for Difference in the Post-Test Mean Gain Scores Difference of the Learners' Convergent Thinking Influence on English Achievement of CLG group & ILG group

Round	Group	N	Mean Gain	S.D.	't'-value	Level ofsignificance
	CLG	18	12.45	3.45		0.05 level

Post-Test	group				12.02	significant
	ILG group	18	2.61	0.40		

Fig. No. 6 Post - Test Mean Gain Scores of the Learners' Convergent Thinking Influenceon English Achievement of CLG group & ILG group

3.3. Effect of Divergent Thinking on English Achievement: Similar patterns emerged for divergent thinking. Pre-test equivalence was observed (t = 0.53, ns). At post-test, CLG achieved significantly higher scores (M = 57.11) compared to ILG (M = 45.16), $t = 3.68$, $p < 0.05$. Gain scores were also significant ($t = 15.36$). This demonstrates the effectiveness of cooperative learning in stimulating creative problem-solving in language contexts.

Table 7

't'-Value for Difference in the Pre-Test Mean Scores of the Learners' Divergent Thinking Influence on English Achievement of CLG group& ILG group

Round	Group	N	Mean	S.D.	't'-value	Level of significance
Pre-*test*	CLG group	18	42.66	4.1302	0.53	0.05 level
	ILG group	18	41.27	10.374		Not significant

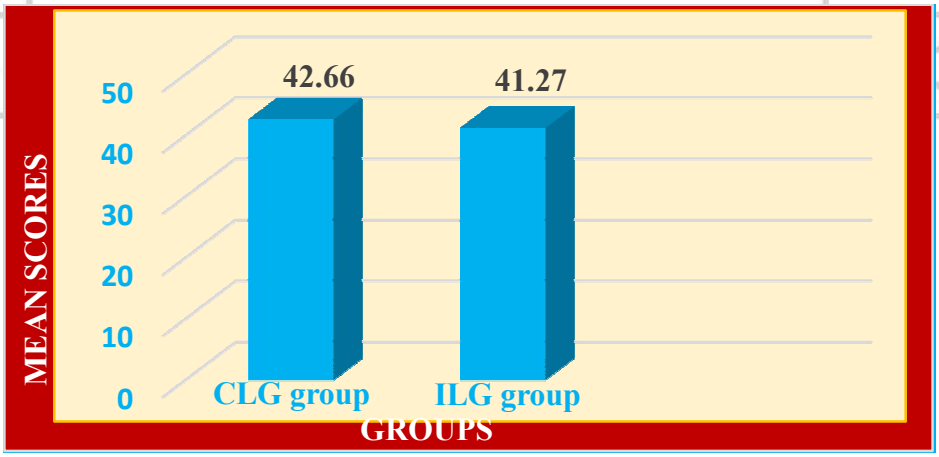

Fig. No. 7 Pre - Test Mean Scores of the Learners' Divergent Thinking Influence on English Achievement of CLG group & ILG group

Table No.8

't'-Value for Difference in the Post-Test Mean Scores of the Learners' Divergent Thinking Influence on English Achievement of CLG group& ILG group

Round	Group	N	Mean	S.D.	't'-value	Level ofsignificance
Post-Test	CLG group	18	57.11	6.452	3.68	0.05 level significant
	ILG group	18	45.16	12.147		

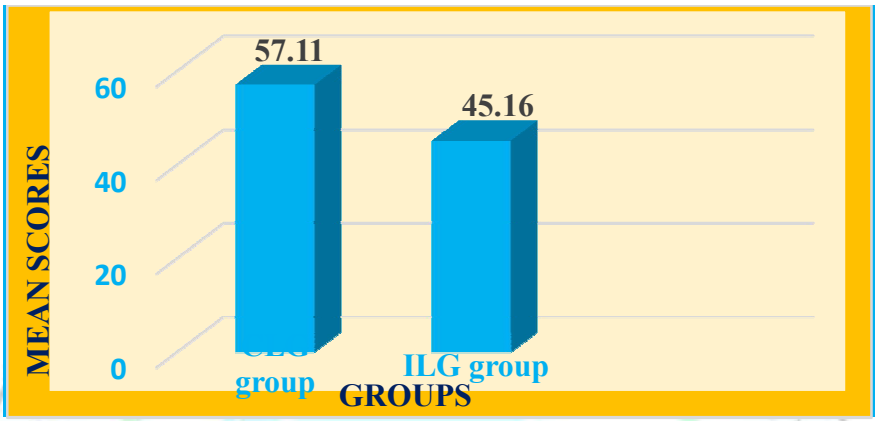

Fig. No. 8 Post - Test Mean Scores of the Learners' Divergent Thinking Influence on English Achievement of CLG group & ILG group

Table No.9

't'-Value for Difference in the Post-Test Mean Gain Scores Differenceof the Learners' Divergent Thinking' Influence on English Achievement of CLG group & ILG group

Round	Group	N	Mean Gain	S.D.	't'-value	Level ofsignificance
Post-Test	CLG group	18	14.45	2.32	15.36	0.05 level significant
	ILG group	18	3.88	1.77		

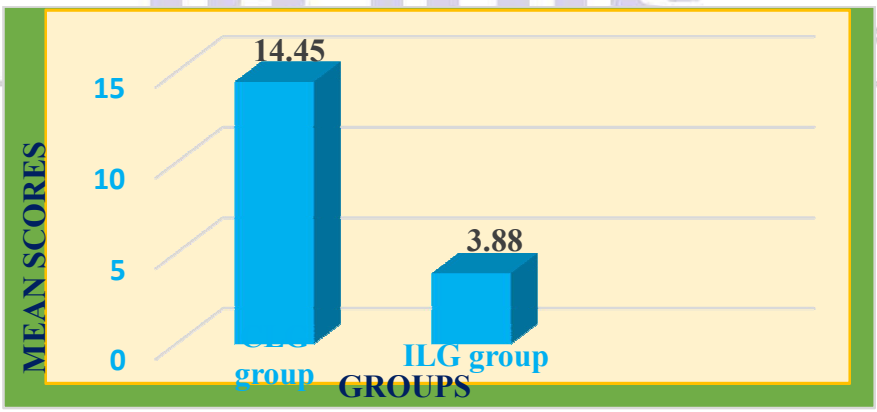

Fig. No. 9 Post-test Mean Gain Scores of the Learners' Divergent Thinking Influence on English Achievement of CLG group & ILG group

3.4. Combined Influence of Convergent and Divergent Thinking: Two-way ANOVA confirmed no pre-test differences (F = 0.97, ns), but post-test analysis indicated significant interaction effects between thinking abilities and learning settings (F = 6.46, $p < 0.01$). Learners exposed to cooperative learning benefited more robustly from both convergent and divergent thinking in achieving higher English performance.

Table No.10

'F'-Value for Difference in the Pre-Test Learners' Convergent and Divergent Thinking Influence'' on English Achievement of CLG group & ILG group

Source of Variation	Degree of freedom (DF)	Residuals		'F'-value	'p'-value	Level of significance
		Sum of Squares (SS)	Mean Squares (MS)			
Between Groups	3	225.25	75.0833	0.97686	0.405611	0.05 level Not significant
Within Groups	140	10760.7222	76.8623			
Total	143	10985.9722				

Table No.11

'F'-Value for Difference in the Post-Test Learners' Convergent and Divergent Thinking Influence on English Achievement of CLG group & ILG group

Source of Variation	**Degree of freedom (DF)**	**Residuals**		**'F'-value**	**'p'-value**	**Level of significance**
		Sum of Squares (SS)	**Mean Squares (MS)**			
Between Groups	3	2444.1667	814.7222	6.46574	0.000394	0.05 level significant
Within Groups	140	17640.8333	126.006			
Total	143	20085				

3.5. Lingual Problem-Solving Performance: Post-testcomparison revealedsignificantly higher academic achievement for CLG (M = 53.83) compared to ILG (M =43.38), $t = 4.11$, $p < 0.05$. Cooperative learning fostered greater mastery in English grammarand problem-solving tasks.

Table No.12

't'-Value for Difference in the Pre-Test Mean Achievement Scores of CLG group and ILG group

Round	Group	N	Mean	S.D.	't'-value	Level of significance
Pre-Test	CLG group	36	40.38	6.38	0.118	0.05 level Not significant
	ILG group	36	40.138	10.79		

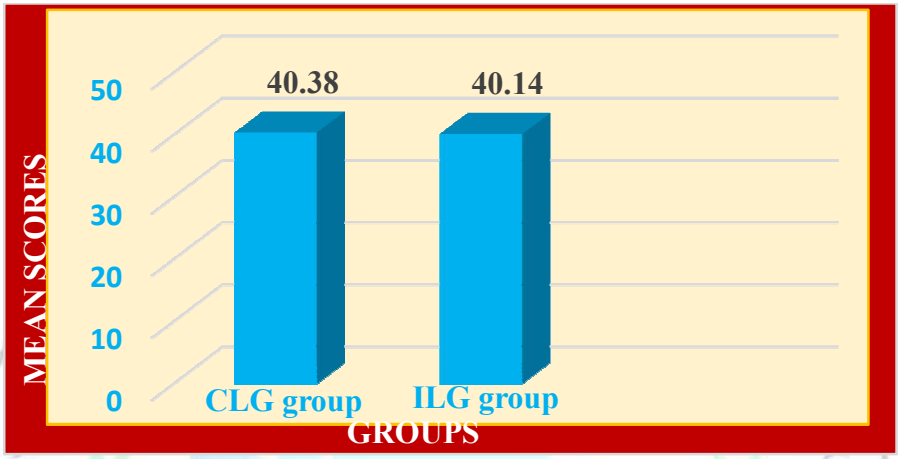

Fig. No. 10 Pre-Test Mean Achievement Scores of CLG group & ILG group

Table 13

't'-Value for Difference in the Post-Test Mean Achievement Scores of CLG group and ILG group

Round	Group	N	Mean	S.D.	't'-value	Level ofsignificance
Post-Test	CLG group	36	53.83	9.48	4.11	0.05 level significant
	ILG group	36	43.38	11.93		

Fig. No. 11 Post- Test Mean Achievement Scores ofCLG group & ILG group

3.6. Differential Aptitude: While no significant pre-test differences existed, CLG learners scored significantly higher at post-test (M = 182.63) than ILG learners (M = 175.22), $t = 2.84$, $p < 0.05$. Cooperative learning thus improved learners' reasoning and aptitude skills.

Table No.14

't'-Value for Difference in the Pre-Test Mean Learners' Differential Aptitude Scores of CLG group and ILG group

Round	Group	N	Mean	S.D.	't'-value	Level of significance
Pre-Test	CLG group	36	171.83	11.28	0.13	0.05 level Not significant
	ILG group	36	172.16	11.29		

Fig. No. 12 Pre-Test Mean Learners' Differential Aptitude Scores of CLG group and ILG group

Table No.15

't'-Value for Difference in the Post-Test Mean Learners' Differential Aptitude Scores of CLG group & ILG group

Round	Group	N	Mean	S.D.	't'-value	Level of significance
Post-Test	CLG group	36	182.63	10.95	2.84	0.05 level significant
	ILG group	36	175.22	11.18		

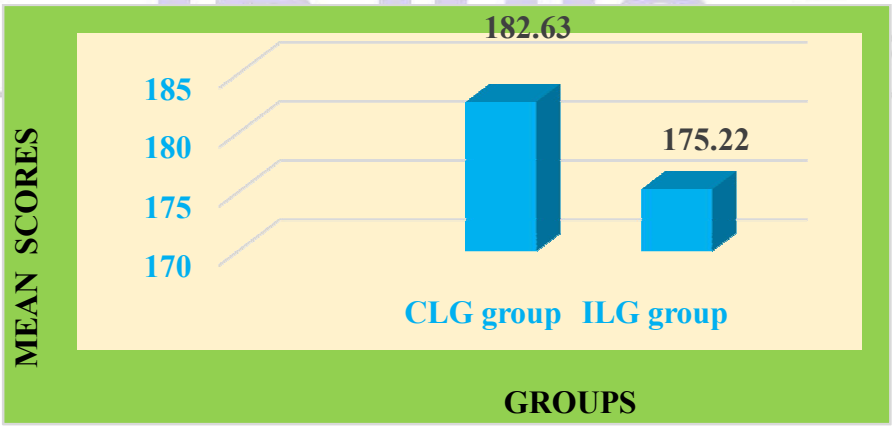

Fig. No. 13 Post-Test Mean Learners' Differential Aptitude Scores of CLG group and ILG group

3.7. Social Acceptability: CLG learners also demonstrated significantly greater social acceptability, as measured by peer evaluations, compared to ILG learners. Cooperative learning facilitated positive interpersonal relations, group integration, and peer recognition, reinforcing its socio-emotional benefits.

Table No.16

't'-Value for Difference in the Pre-Test Mean Learners' Social Acceptability Scores of CLG group and ILG group

Group	Stars/ Isolates	N	Mean	S.D.	't'-value	Level ofSignificance
CLG group	a. Stars	17	162.35	79.29	3.36	0.05 level significant
	b. Isolates	19	112.63	18.95		
ILG group	a. Stars	18	133.94	32.38		
	b. Isolates	18	110.66	27.48		

Table No.17

Difference in Social Acceptability Mean Scores of 'Stars' in CLG group and ILG group Before the Experiment

Group	N (Stars)	Mean	S.D.	't'-value	Level ofsignificance
CLG group	17	162.35	79.29	1.40	0.05 levelNot significant
ILG group	18	133.94	32.38		

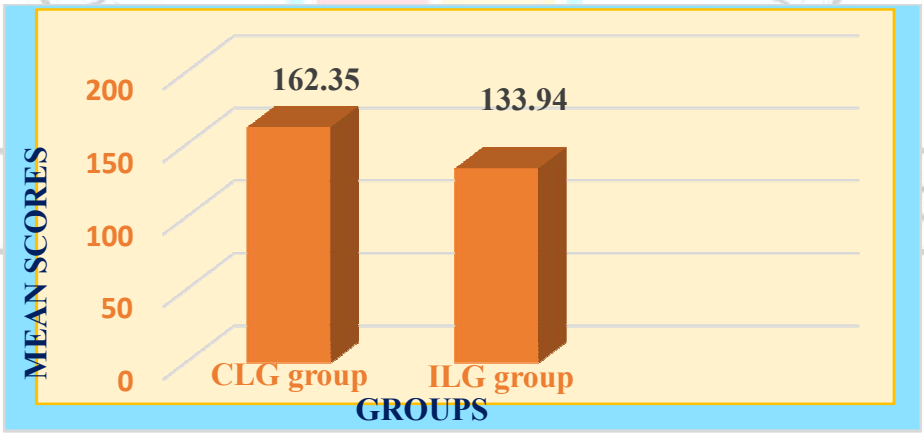

Fig. No. 14Pre-Test Mean Learners' Social Acceptability Scores of 'Stars' in CLG group and ILG group

Table 18

't'-Value for Difference in the Post-Test Mean Learners' Social Acceptability Scores of CLG group and ILG group

Group	Stars/ Isolates	N	Mean	S.D.	't'-value	Level ofsignificance
CLG group	a. Stars	29	108.27	21.54	2.38	0.05 level significant
	b. Isolates	7	162.43	21.84		
ILG group	a. Stars	20	125.9	30.35		
	b. Isolates	16	111.56	25.11		

Table 19

Difference in Social Acceptability Mean Scores of 'Stars' in ILG group Before and After the Experimental Treatment

Group	N (Stars)	Mean	S.D.	't'-value	Level of significance
1. Before Experiment	18	133.94	32.38	0.79	0.05 Not significant
2. After Experiment	20	125.9	30.35		

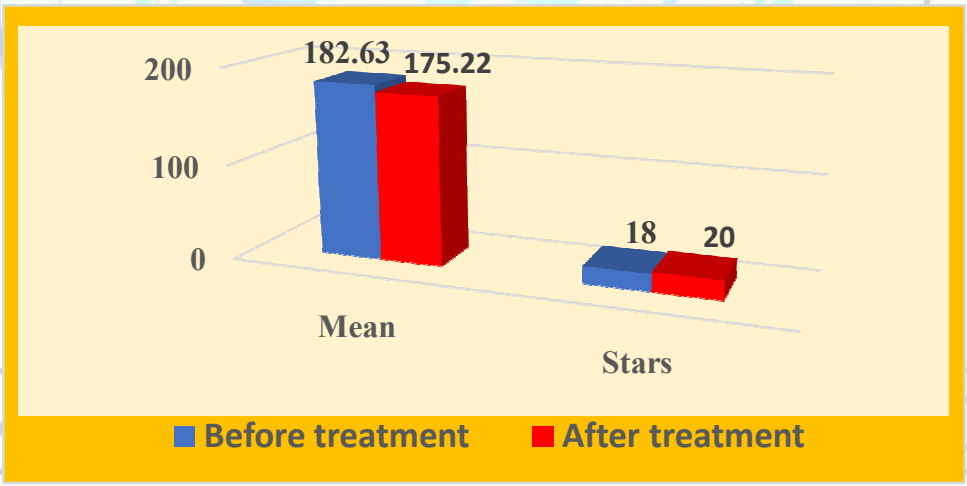

Fig. No. 15 Social Acceptability Mean Scores and Numbers of 'Stars' in ILG group Before and After the Experimental Treatment

Table 20

Difference in Social Acceptability Mean Scores of 'Stars' in CLG group Before and After the Experimental Treatment

Group	N (Stars)	Mean	S.D.	't'-value	Level of significance
1. Before Experiment	17	162.35	79.29	3.48	0.05 level Significant
2. After Experiment	29	108.27	21.54		

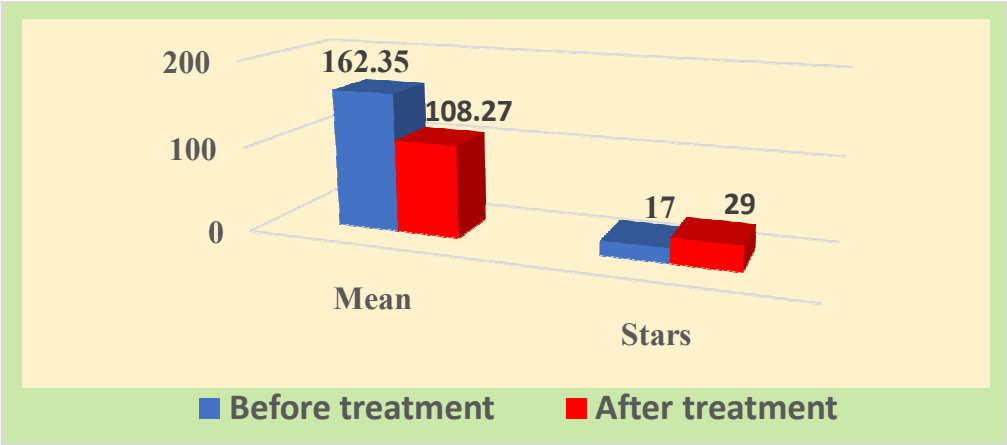

Fig. No. 16Social Acceptability Mean Scores and Numbers of 'Stars' in CLG group Before and After the Experimental Treatment

Table 21

Gain in Social Acceptability Scores of 'Stars' in CLG group and ILG group After the Experimental Treatment

Group	Stars (Gain Number)	Stars (total Number)	Mean	S.D.	't'-value	Level of significance
l. (CLG)	12	29	108.27	21.54	2.38	0.05 level Significant
2. (ILG)	02	20	125.9	30.35		

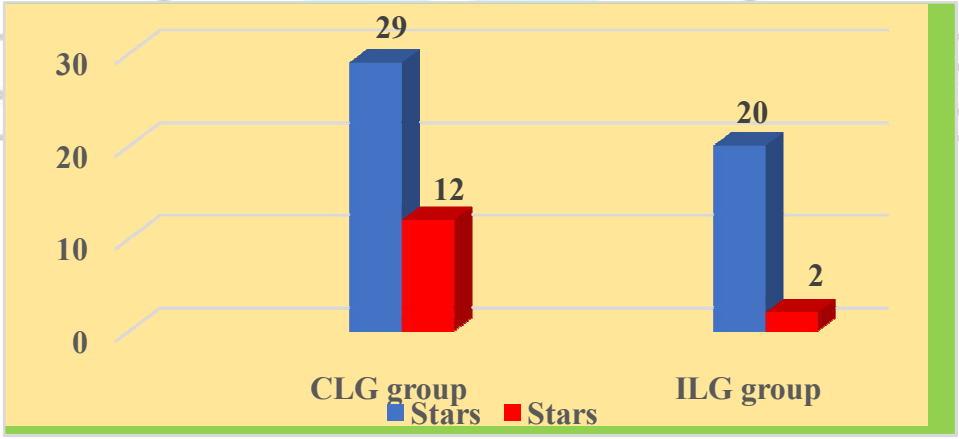

Fig. No. 17Gain in Social Acceptability Scores of 'Stars' in CLG group and ILG group After the Experimental Treatment

4. DISCUSSION:

The findings underscore the pedagogical advantage of cooperative learning in nurturing both cognitive and affective outcomes. Learners exposed to TGT not only improved academically but also demonstrated heightened creativity, problem-solving aptitude, and social integration.

4.1. Convergent Thinking: Convergent thinking, characterized by logical problem-solving, was significantly enhanced under cooperative conditions. This aligns with prior research suggesting that structured group work promotes critical reasoning (Anderson, 2010).

4.2. Divergent Thinking: The notable gains in divergent thinking reflect cooperative learning's capacity to foster creativity through dialogue, brainstorming, and peer scaffolding. Johnson and Johnson (2009) similarly highlighted that collaborative contexts stimulate originality and flexibility in thought.

4.3. Differential Aptitude and Social Acceptability: Improvements in differential aptitude suggest that cooperative learning extends beyond academic achievement, cultivating transferable problem-solving skills. Enhanced social acceptability further validates Vygotsky's (1978) socio-cultural theory, which emphasizes the role of social interaction in learning.

4.4. Implications: The study suggests that integrating cooperative learning strategies like TGT into classroom practices can simultaneously strengthen cognitive skills and socio-emotional development. Policymakers and educators should consider adopting such learner-centered methodologies to replace over-reliance on traditional individualistic instruction.

5. CONCLUSION:

This study demonstrates that cooperative learning significantly outperforms individualistic approaches in fostering convergent and divergent thinking abilities, linguistic problem-solving, differential aptitude, and social acceptability. By creating supportive peer-based environments, cooperative methods enhance not only academic outcomes but also creativity and interpersonal skills.

The findings have direct implications for classroom pedagogy, advocating for wider adoption of cooperative learning structures to promote holistic learner development. Future research may extend this work by incorporating longitudinal designs and exploring its applicability across diverse subjects and educational levels.

6. REFERENCES:

1. Anderson, J. R. (2010). *Cognitive Psychology and Its Implications* (7th ed.). Worth Publishers.
2. Best, J. W., & Kahn, J. V. (2006). *Research in Education* (10th ed.). Pearson Education.
3. Johnson, D. W., & Johnson, R. T. (2009). *An Educational Psychology Success Story: Social*

Interdependence Theory and Cooperative Learning. Educational Researcher, 38(5), 365–379.

4. Sharma, K. N. (1987). *Divergent Production Ability Test.* National Psychological Corporation.
5. Slavin, R. E. (1995). *Cooperative Learning: Theory, Research, and Practice* (2nd ed.). Allyn and Bacon.
6. Tandon, R. K. (n.d.). *General Mental Ability Group Test.* National Psychological Corporation.
7. Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes.* Harvard University Press.