

Evaluating the Impact of Cooperative Learning Strategies on the Development of Critical Thinking Skills Among Secondary School Students in Balochistan

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Abstract

The global educational landscape is increasingly shifting from passive rote memorization toward the cultivation of higher-order cognitive abilities. In Balochistan, Pakistan, this transition faces significant hurdles due to a traditional "banking model" of education, geographical isolation, high poverty rates, and deteriorating infrastructure. This paper evaluates the impact of cooperative learning (CL) strategies specifically the Jigsaw method, Student Teams–Achievement Divisions (STAD), and Think-Pair-Share (TPS) on the development of critical thinking skills among secondary school students. Drawing on social interdependence and cognitive development theories, the study explores how structured peer interaction fosters core skills such as analysis, evaluation, and self-regulation. Empirical evidence suggests that CL significantly outperforms traditional competitive structures, with innovative pedagogies showing a strong positive impact on critical thinking (beta = 0.536). Furthermore, the study highlights how cooperative environments facilitate "translanguaging," allowing students to use native dialects to bridge linguistic barriers and deepen conceptual understanding. Despite sociocultural resistance and systemic challenges, the implementation of CL, aligned with the Balochistan Education Sector Plan 2020-2025, offers a transformative pathway for enhancing student engagement, social cohesion, and academic achievement.

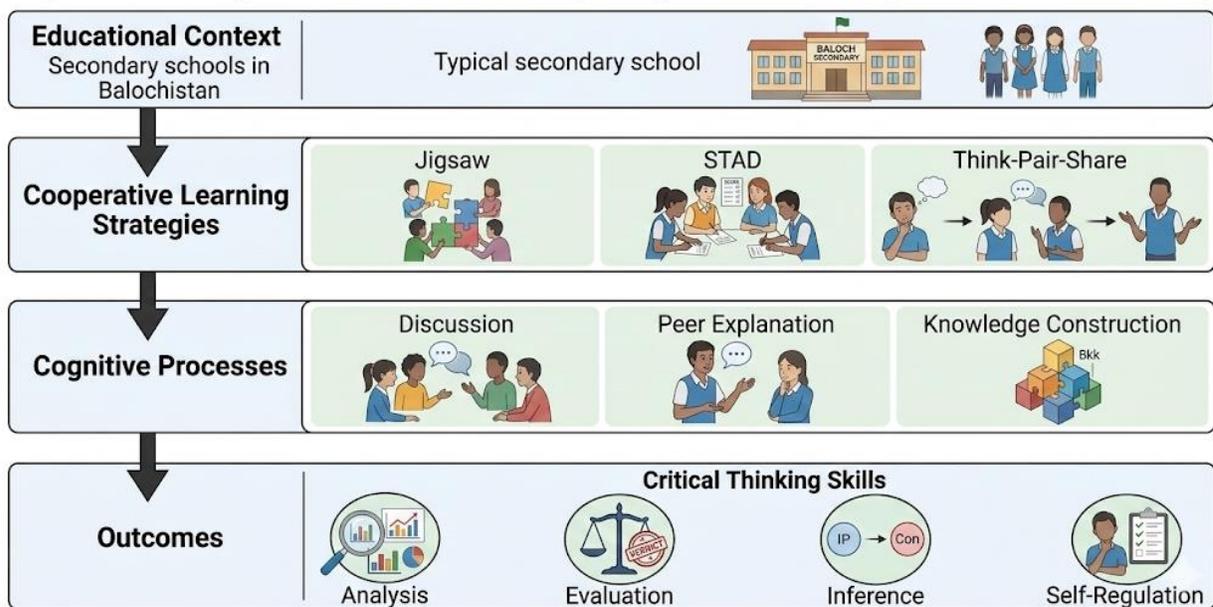
Keywords: Cooperative Learning, Critical Thinking, Balochistan Education, Jigsaw Method, Secondary Education, Pedagogy, Social Interdependence.

1. Introduction: Theoretical Framework and the Evolution of Pedagogy

The paradigm shift in global education increasingly emphasizes the transition from passive knowledge reception to the active cultivation of higher-order cognitive abilities. Critical thinking is generally characterized as the intentional application of rational, high-level thinking skills such as analysis, synthesis, problem recognition, inference, and evaluation (Belmekki, 2025; Beyer, 1995). In the context of the Global South, and particularly within Balochistan, this shift faces significant structural and cultural inertia. Traditional education systems in these regions have historically relied on the banking model of education, where students are expected to memorize and regurgitate information (Akbar & Akhtar, 2021). To counter this, cooperative learning has emerged as a robust instructional strategy that leverages small, heterogeneous groups of students to maximize their own and each other's learning (Johnson et al., 2021; Rajab & Ibrahim,

2017). Figure 1 presents the conceptual framework linking cooperative learning strategies to the development of critical thinking skills among secondary school students.

Figure 1: Conceptual Framework Linking Cooperative Learning and Critical Thinking



Cooperative learning is grounded in several theoretical foundations, most notably social interdependence theory, cognitive development theory, and motivational theory (Akbar & Akhtar, 2021; Belmekki, 2025). Social interdependence theory suggests that the way social interaction is structured determines how individuals interact, which in turn determines outcomes (Johnson et al., 2021). In a cooperative structure, positive interdependence exists when individuals perceive that they can reach their goals if, and only if, their peers also reach their goals (Johnson et al., 2021; Rajab & Ibrahim, 2017).

Cognitive development theory, drawing from the works of Piaget and Vygotsky, posits that social interaction provides the necessary cognitive conflict and scaffolding for students to move through their zones of proximal development (Akbar & Akhtar, 2021; Belmekki, 2025). Vygotsky’s sociocultural theory further argues that language serves as the primary tool for this cognitive transformation (Belmekki, 2025). Within a cooperative group in a Balochistan secondary school, the act of explaining a complex concept to a peer in a shared dialect can bridge the gap between abstract textbook content and the student’s lived reality (Alia et al., 2020; Kurd & Hassan, 2022).

Table 1: Educational Orientations and Knowledge Relationships

Educational Orientation	Instructional Mechanism	Relationship to Knowledge
Traditional / Passive	Lecture-driven, individualistic, competitive.	Knowledge as static, to be memorized.
Collaborative Learning	Loosely structured, self-managed peer groups.	Knowledge as a social construct, shared.
Cooperative Learning	Highly structured, positive interdependence.	Knowledge as a tool for problem-solving.
Critical Thinking	Intentional application of higher-order skills.	Knowledge as a subject of scrutiny.

2. The Architecture of Critical Thinking Skills

Critical thinking is a composite of various cognitive skills and affective dispositions. Consensus definitions identify core cognitive skills: interpretation, analysis, evaluation, inference, explanation, and self-regulation (Belmekki, 2025; Facione, 2013). For secondary school students in Balochistan, mastery of these skills is essential for navigating a complex socio-economic landscape (Irshad, 2022).

Analysis involves identifying inferential relationships among statements or concepts (Beyer, 1995; Facione, 2013). Evaluation requires assessing the credibility of statements and the logical strength of arguments (Beyer, 1995; Facione, 2013). Self-regulation is the meta-cognitive process of monitoring one's own cognitive activities and results to confirm or correct reasoning (Belmekki, 2025; Beyer, 1995). Modern research emphasizes that while schools often struggle to teach these skills, they can be fostered through structured teacher communication and specific questioning strategies (Sari et al., 2025).

Table 2: Skill Components and Functional Definitions

Skill Component	Functional Definition	Critical Thinking Disposition
Interpretation	Categorizing and clarifying meaning.	Open-mindedness toward perspectives.
Analysis	Examining ideas and detecting arguments.	Inquisitiveness and desire for clarity.
Evaluation	Assessing claims and arguments.	Truth-seeking and respect for evidence.
Inference	Querying evidence and drawing conclusions.	Systematicity in problem-solving.
Explanation	Stating results and justifying procedures.	Confidence in the power of reasoning.
Self-Regulation	Self-examination and self-correction.	Cognitive maturity and healthy skepticism.

3. Secondary Education in Balochistan: A Contextual Analysis

Balochistan faces significant challenges that complicate the delivery of educational services, including geographical isolation and high poverty rates (Irshad, 2022). The literacy rate in the province stands at 46%, with a substantial gender gap where female literacy is only 33% (Shah, 2024). The education sector is characterized by a learning crisis where even regular attendees fail to achieve basic literacy and numeracy outcomes (Balochistan Education Sector Plan, 2020; World Bank, 2023).

A primary cause of this crisis is an outdated, rigid curriculum that emphasizes rote memorization and a high-stakes examination system (Balochistan Education Sector Plan, 2020; Shah, 2024). Furthermore, the physical infrastructure is deteriorating; 22.1% of schools are categorized as non-functional, and over 850 schools have no buildings at all (Shah, 2024).

Table 3: Infrastructure Status and Impact on Pedagogy

Infrastructure Component	Status in Balochistan Schools	Impact on Pedagogy
Functional Buildings	22.1% are non-functional.	Lack of physical space for group work.
Basic Facilities (WASH)	Many lack clean water and boundary walls.	Low incentive for student attendance.
Teacher Availability	Over 50% are single-teacher institutions.	High cognitive load prevents complex strategies.
Digital Devices	Present in some schools but often unusable.	Limits access to modern information.

4. Cooperative Learning Strategies: Mechanisms and Models

Cooperative learning is operationalized through various structured models designed to trigger specific cognitive and social processes. In Balochistan, strategies must be calibrated to available resources and the students' cognitive levels (Akbar & Akhtar, 2021; Rajab & Ibrahim, 2017).

4.1 The Jigsaw Method

This is an expert-specialization strategy where a topic is divided into segments. Students join "expert groups" to research their segment before returning to their "home groups" to teach their teammates (Johnson et al., 2021). This forces students to synthesize and communicate information, which are key components of critical thinking (Akbar & Akhtar, 2021).

4.2 Student Teams–Achievement Divisions (STAD)

STAD is effective for subjects with clearly defined answers like mathematics and science. Students work in mixed-ability teams to master content initially delivered by the teacher (Johnson et al., 2021). Success is determined by "improvement points" on individual quizzes, ensuring students of all levels contribute (Johnson et al., 2021; Rajab & Ibrahim, 2017).

4.3 Think-Pair-Share (TPS)

TPS is a versatile, low-cost strategy involving individual reflection, partner discussion, and class-wide sharing (SimpleK12, 2025). It provides crucial "wait time" for cognitive processing, allowing students to move beyond surface-level responses to more analytical thought (Akbar & Akhtar, 2021; SimpleK12, 2025).

Table 4: Cooperative Learning Strategies and Targeted Skills

Strategy	Functional Mechanism	Targeted Skill	Resource Requirement
Jigsaw	Expert specialization; peer teaching.	Synthesis, Analysis, Explanation.	High.
STAD	Mixed-ability mastery; team rewards.	Concept mastery, Peer Tutoring.	Moderate.
Think-Pair-Share	Structured reflection and dialogue.	Initial Analysis, Interpretation.	Low.

5. Impact of Cooperative Learning: Empirical Evidence

The effectiveness of cooperative learning in developing critical thinking is supported by meta-analyses showing that students in cooperative groups achieve significantly more than those in competitive or individualistic structures (Johnson et al., 2021). Innovative pedagogical approaches have been shown to have a positive and significant impact on student critical thinking ($\beta = 0.536$, $p < 0.001$) and learning outcomes ($\beta = 0.551$, $p < 0.001$) (Sari et al., 2025).

Research in higher secondary schools in Pakistan specifically shows that strategies like Jigsaw significantly improve students' skills in interpretation and analysis (Akbar & Akhtar, 2021). Furthermore, while digital technologies present a potential threat to traditional critical thinking through algorithmic influence, they also act as an enabler when structured pedagogies are used to guide students in researching and analyzing information online (Beyer, 2025). Figure 2 illustrates the pathway through which structured cooperative learning environments enhance critical thinking development.

Figure 2: Pathways from Cooperative Learning to Critical Thinking Development

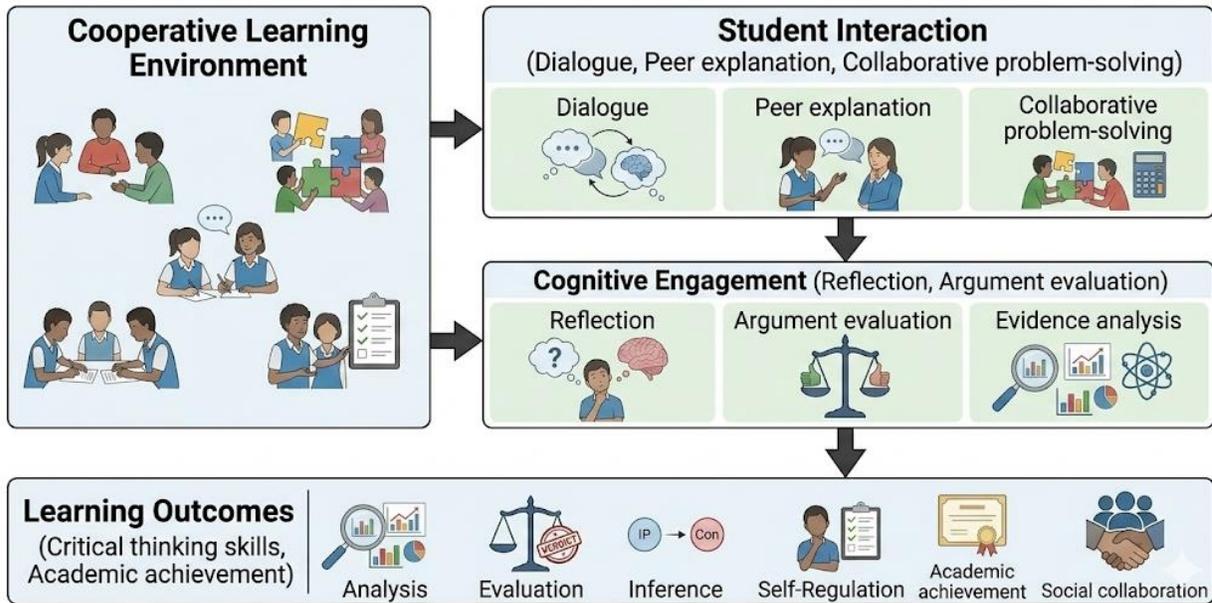


Table 5: Summary of Empirical Impact Findings

Study Focus	Finding	Impact Value (beta)
Interactive Teaching	Significant boost in critical thinking and performance.	0.536
Jigsaw Strategy	Significantly higher scores over traditional methods.	Mean 19.04 vs 16.07
Cognitive Engagement	CL has significant positive effect on engagement.	High Correlation

6. Linguistic Diversity and Critical Thinking

In Balochistan, the choice of instruction medium is a critical factor. Teaching in a child's first language is more effective for grasping basic concepts than instruction in a second or third language (Alia et al., 2020). For many students, transitioning to Urdu or English creates a "linguistic barrier" that slows down cognitive processing and leads to a reliance on "cramming" jargon without understanding (Alia et al., 2020; Shah, 2024). Cooperative learning can mitigate this by allowing "translanguaging"—using multiple languages for learning—within the group (Alia et al., 2020; Kurd & Hassan, 2022). Students can discuss concepts in their native dialect to clarify understanding before presenting in the official medium of instruction (Alia et al., 2020; Kurd & Hassan, 2022).

7. Sociocultural Barriers and Gender Empowerment

Cultural landscape and traditional values often influence education in Balochistan. In some communities, interactive pedagogy is viewed as a distraction from the syllabus (Shah, 2024). Teachers often face a two-fold struggle: they must unlearn conventional lecturing methods and overcome resistance from parents who prioritize board exam performance over active learning (UNICEF Pakistan, 2025).

However, programs like the EU-funded Balochistan Education Support-II (BES II) show that cooperative learning can be transformative, particularly for female students (UNICEF Pakistan, 2025). By pairing students in supportive groups, teachers create safe spaces for girls to develop their "voice," boosting confidence and encouraging active participation (UNICEF Pakistan, 2025).

8. Policy Frameworks: BESP 2020-2025

The Balochistan Education Sector Plan (BESP) 2020-2025 emphasizes "Learning" and "Access" as top priorities (Balochistan Education Sector Plan, 2020). It aims to re-design teacher training to focus on "Learning Design," treating textbooks and pedagogy as an integrated framework (Balochistan Education Sector Plan, 2020). The plan also calls for a move toward professionalizing the teaching cadre and making decisions based on empirical evidence rather than tradition (Balochistan Education Sector Plan, 2020).

Table 6: BESP 2020-2025 Strategic Targets

BESP Target	Quantitative Goal	Intended Pedagogical Outcome
CPD Effectiveness	75% of teachers test "satisfactory".	Improved CL implementation.
Negative Pedagogy	60% reduction in corporal punishment.	Safer environment for thinking.
Assessment Reform	regular diagnostic assessments by BAEC.	Move away from rote-learning.

9. Deeper Insights and Second-Order Implications

Structured cooperative learning design through clear task allocation and creative group work significantly enhances student engagement across personal skills and collaboration (Sindhushree et al., 2025). Furthermore, it has the potential to foster social cohesion in a province marked by ethnic diversity (Kurd & Hassan, 2022). There is an observable "ripple effect" where improvements in teaching quality lead to increased public trust in government schools, encouraging parents to keep children in school longer (UNICEF Pakistan, 2025).

10. Conclusions and Strategic Recommendations

The evaluation of cooperative learning strategies in Balochistan reveals a landscape of immense challenge and profound potential. While systemic hurdles like poor infrastructure and linguistic barriers are significant, research shows that well-structured cooperative models are effective catalysts for cognitive development.

Strategic recommendations include:

- **Professionalization over Bureaucracy:** Continue to treat teachers as professionals, providing autonomy and support (Balochistan Education Sector Plan, 2020).
- **Infrastructure as a Foundation:** Urgently address the lack of basic facilities such as electricity and functional buildings (Shah, 2024).
- **Linguistic Empowerment:** Contextualize materials to leverage native languages as a bridge to mastering national and official languages (Alia et al., 2020).
- **Assessment for Learning:** Reform the examination system to reward analytical reasoning and original thought (Balochistan Education Sector Plan, 2020).

Conclusion

The evaluation of cooperative learning strategies in Balochistan reveals a landscape characterized by both immense challenges and profound potential. While systemic hurdles such as poor infrastructure, single-teacher institutions, and significant linguistic barriers continue to complicate educational delivery, research demonstrates that well-structured cooperative models serve as effective catalysts for cognitive development. Strategies like Jigsaw and STAD not only improve mastery of content but also empower students to move beyond "cramming" toward analytical reasoning and original thought. To fully realize these benefits, the province must move toward the professionalization of the teaching cadre, ensuring educators have the autonomy and training to implement active learning designs. Additionally, reforming the high-stakes examination system and addressing the lack of functional school buildings are essential steps for creating a sustainable environment where critical thinking can flourish. Ultimately, by leveraging native languages as a cognitive bridge and fostering supportive group dynamics, cooperative learning can

reshape the educational landscape in Balochistan, promoting both academic excellence and social cohesion.

References

- Adnan, M., Afzal, M., & Ahmed, A. (2025). Teaching critical thinking in science: Perceptions and practices of secondary school science teachers in Panjgur, Balochistan. *ACADEMIA International Journal for Social Sciences*, 4(4), 6341–6359.
- Akbar, T., & Akhtar, M. (2021). Effect of cooperative learning strategies on students' critical thinking skills; interpretation and analysis at higher secondary level. *Sir Syed Journal of Education & Social Research (SJESR)*, 4(2), 386–394.
- Alia, A., Ayub, S., & Aslam, A. (2020). Reading difficulties in Urdu reading: A case study of Baloch students. *Journal of Education and Humanities Research*, 9(1), 52–67.
- Balochistan Education Sector Plan. (2020). *Balochistan education sector plan (BESP) 2020-25*. Secondary Education Department, Government of Balochistan. <https://test.emis.gob.pk/Uploads/BESP2020-25.pdf>
- Belmekki, M. (2025). The learning, teaching and assessment of critical thinking in higher education. *The Journal of Quality in Education (JoQiE)*, 15(25), 95–113.
- Beyer, B. K. (1995). *Critical thinking*. Phi Delta Kappa Educational Foundation.
- Beyer, S. (2025). The influence of technology on human consciousness: Critical thinking as both an enabler and potential threat. *Nature and Culture*.
- Facione, P. A. (2013). *Critical thinking: What it is and why it counts*. Insight Assessment.
- Irshad, S. (2022). Challenges to education in Balochistan: The case study of Turbat. *BUIITEMS Journal of Social Sciences and Humanities*, 1(2).
- Johnson, D. W., Johnson, R. T., & Holubec, E. J. (2021). Effects of cooperative learning on student achievement: A meta-analysis of randomized controlled trials. *ResearchGate*.
- Kurd, A. H., & Hassan, M. (2022). Attitude of Balochistan's youth towards indigenous language Brahui as compared to Urdu and English. *Pakistan Journal of Social Research*, 4(1), 785–792.
- Rajab, A., & Ibrahim, M. (2017). *Developing critical thinking through cooperative learning*. Scribd. <https://www.scribd.com/document/231701711/Developing-Critical-Thinking-Through-Cooperative-Learning>
- Sari, H., Samsinar, & Rajiman, W. (2025). Teacher communication strategies: Fostering critical thinking skills in the classroom. *Journal of Applied Pedagogies*.
- Shah, S. A. (2024, December 1). Balochistan to overhaul education sector. *The Express Tribune*. <https://tribune.com.pk/story/2512793/balochistan-to-overhaul-education-sector>
- SimpleK12. (2025). *Cooperative learning: An introduction*. <https://www.simplek12.com/blog/cooperative-learning-introduction>
- Sindhushree, R. P., Prasad, A., & Raj, M. P. (2025). Intelligent tools, intuitive designers: AI's role in architectural education. *BMS College of Architecture*.
- UNICEF Pakistan. (2025, May 29). *Reshaping education landscape in Balochistan*. <https://www.unicef.org/pakistan/stories/reshaping-education-landscape-balochistan>
- World Bank. (2023). *Logistics performance index 2023*. <https://documents1.worldbank.org/curated/en/099021925092518797/txt/P507717-f4a94e59-e92c-4283-b1bb-0544b9fdcf2e.txt>