

EFFECTIVENESS OF THE THINK-PAIR-SHARE COOPERATIVE LEARNING STRATEGY ON CLASSROOM ENGAGEMENT AND LEARNING OUTCOMES AMONG UNDERGRADUATE NURSING STUDENTS

Chaman Dania^{*1}, Qamar-Un-Nisa², Shazia Taj³, Swaiba Shams⁴, Zainab Aziz⁵

^{*1}MS Nursing Scholar, College of Nursing, Nishtar Medical University, Multan

²Dean/Principal, College of Nursing, Nishtar Medical University Multan

³Nursing Instructor, College of Nursing, Nishtar Medical University, Multan

⁴College of Nursing, Nishtar Medical University Multan

⁵MS Nursing Scholar, College of Nursing, Nishtar Medical University Multan

chamandania786@gmail.com^{1*}, qamarunnisa1122@gmail.com², shazyiataaj80@gmail.com³, swaibashams872003@gamil.com⁴, zani8667@gmail.com⁵

DOI: <https://doi.org/10.5281/zenodo.23338395>

Keywords

Think-Pair-Share, cooperative learning, classroom engagement, learning outcomes, nursing students, Pakistan.

Article History

Received: 25 June 2026

Accepted: 16 September 2026

Published: 02 October 2026

Copyright @Author

Corresponding Author: *

Chaman Dania

Abstract

Background: Traditional lecture-based instruction in nursing education often limits active student participation and critical thinking development. The Think-Pair-Share (TPS) cooperative learning strategy has emerged as a promising pedagogical approach to enhance engagement and learning outcomes.

Objective: To evaluate the effectiveness of the Think-Pair-Share cooperative learning strategy on classroom engagement and learning outcomes among undergraduate nursing students at Nishtar College of Nursing, NMU Multan.

Methods: A quasi-experimental pretest-posttest control group design was employed with 120 undergraduate nursing students (60 in the experimental group and 60 in the control group). The experimental group received instruction through the TPS strategy, while the control group received traditional lecture-based instruction. Classroom engagement was measured using the Classroom Engagement Survey (CES), and learning outcomes were assessed through a researcher-developed knowledge test.

Results: The experimental group demonstrated significantly higher post-intervention classroom engagement scores ($M = 4.21$, $SD = 0.48$) compared to the control group ($M = 3.42$, $SD = 0.56$), with $t(118) = 8.34$, $p < .001$. Similarly, learning outcome scores were significantly higher in the experimental group ($M = 82.45$, $SD = 7.23$) than in the control group ($M = 71.18$, $SD = 8.91$), $t(118) = 7.56$, $p < .001$.

Conclusion: The Think-Pair-Share strategy significantly enhances classroom engagement and learning outcomes among undergraduate nursing

students. Integrating TPS into nursing curricula is recommended to foster active learning and improve academic performance.

INTRODUCTION

Nursing education demands pedagogical approaches that prepare students for the complexities of clinical practice, including critical thinking, effective communication, and collaborative decision-making (Li and Tu, 2024). Traditional lecture-based instruction, characterized by passive information transmission, has been increasingly critiqued for failing to adequately develop these essential competencies (Alsolais, 2024). In resource-constrained settings such as Pakistan, where nursing programs often face large class sizes and limited interactive learning opportunities, the need for evidence-based, low-cost, and scalable active learning strategies is particularly acute (Khan et al., 2023). The Think-Pair-Share (TPS) strategy, developed by Frank Lyman in 1981, is a cooperative learning technique that structures classroom interaction into three phases: individual thinking, paired discussion, and whole-class sharing (Tokac et al., 2025). This structured sequence ensures that all students, including those who are less vocal or less confident, have the opportunity to process information, articulate their understanding, and learn from peers. TPS is grounded in Vygotsky's sociocultural theory, particularly the Zone of Proximal Development (ZPD), which posits that learning is fundamentally a social process wherein learners benefit from interaction with more knowledgeable peers (Dorri et al., 2024). Additionally, social interdependence theory provides a framework for understanding how positive interdependence and individual accountability within cooperative groups drive collective and individual achievement (Ozkan et al., 2024).

Empirical evidence supporting TPS in nursing education has been accumulating. Alsolais (2024) demonstrated that TPS significantly enhanced drug dosage calculation skills among nursing students, with posttest mean scores rising from 11.21 to 21.18 ($t = -23.13$, $p = .0001$). Tokac et

al. (2025) reported that moving from the "Think" to "Share" phase in online nursing biostatistics courses improved response accuracy from 82.0% to 90.3%, with qualitative feedback indicating increased comprehension and satisfaction. Similarly, a meta-analysis by Ozkan et al. (2024) indicated that cooperative learning techniques positively affect academic achievement, skills, and attitudes in nursing students. These findings align with broader evidence indicating that active learning strategies significantly enhance classroom engagement and learning outcomes in nursing education (Lan et al., 2024).

Despite this growing body of evidence, research on TPS in nursing education within the Pakistani context remains scarce. Studies from Pakistan have explored active learning strategies and student engagement in nursing education (Khan et al., 2023; Farooq et al., 2022), but the specific application of TPS to classroom engagement and learning outcomes has not been systematically investigated in this setting. Furthermore, Nishtar College of Nursing, recently declared a constituent institution of Nishtar Medical University (NMU), Multan, is undergoing curricular modernization aimed at aligning nursing education with international standards. Evaluating the effectiveness of active learning strategies such as TPS within this institutional context is timely and relevant.

This study addresses this gap by investigating the effectiveness of the TPS cooperative learning strategy on classroom engagement and learning outcomes among undergraduate nursing students at Nishtar College of Nursing, NMU Multan. The findings are expected to inform pedagogical decision-making and contribute to the evidence base for cooperative learning in nursing education in Pakistan.

Research Objectives

1. To assess the effectiveness of the Think-Pair-Share cooperative learning strategy on classroom

engagement among undergraduate nursing students at Nishtar College of Nursing, NMU Multan.

2. To evaluate the effectiveness of the Think-Pair-Share cooperative learning strategy on learning outcomes among undergraduate nursing students at Nishtar College of Nursing, NMU Multan.

3. To compare the classroom engagement and learning outcomes between students taught through the TPS strategy and those taught through traditional lecture-based instruction.

Research Questions

1. What is the effect of the Think-Pair-Share cooperative learning strategy on classroom engagement among undergraduate nursing students?

2. What is the effect of the Think-Pair-Share cooperative learning strategy on learning outcomes among undergraduate nursing students?

3. Is there a significant difference in classroom engagement and learning outcomes between students exposed to the TPS strategy and those receiving traditional instruction?

Hypotheses

H₁: Undergraduate nursing students taught through the Think-Pair-Share strategy will demonstrate significantly higher classroom engagement scores than those taught through traditional lecture-based instruction.

H₂: Undergraduate nursing students taught through the Think-Pair-Share strategy will achieve significantly higher learning outcome scores than those taught through traditional lecture-based instruction.

H₀: There will be no significant difference in classroom engagement and learning outcomes between students taught through the Think-Pair-Share strategy and those receiving traditional instruction.

Literature Review

Theoretical Foundations of Cooperative Learning

Cooperative learning is underpinned by multiple theoretical perspectives that collectively explain

why structured peer interaction enhances learning (Kombat et al., 2023). Vygotsky's sociocultural theory emphasizes that cognitive development occurs through social interaction, particularly within the Zone of Proximal Development the gap between what a learner can accomplish independently and what they can achieve with guidance from more competent peers (Dorri et al., 2024). In the TPS strategy, the "Pair" phase operationalizes the ZPD by enabling students to scaffold each other's understanding through dialogue and explanation.

Social interdependence theory posits that the structure of goal interdependence determines interaction patterns and outcomes. Positive interdependence where individuals perceive that their success is linked to the success of their group promotes promotive interaction, individual accountability, and interpersonal skill development (Dorri et al., 2024). TPS embodies these principles by requiring individual preparation ("Think"), dyadic collaboration ("Pair"), and collective knowledge construction ("Share"). Additionally, cognitive developmental theory, drawing on Piaget's concepts of disequilibrium and cognitive conflict, suggests that peer interaction exposes learners to diverse perspectives that challenge existing schemas, prompting cognitive restructuring (Ozkan et al., 2024).

The empirical literature on TPS in nursing education has grown substantially over the past five years. Alsolais (2024) conducted a one-group pretest-posttest experimental study with 34 level-eight nursing students at Shaqra University, Saudi Arabia, to evaluate TPS effectiveness in drug dosage calculation. Pretest results indicated a mean score of 11.21 (SD = 2.24), reflecting inadequate competence. Following the TPS intervention, the mean score increased significantly to 21.18 (SD = 1.14), with a paired t-test confirming statistical significance ($t = -23.13$, $p = .0001$). The study concluded that TPS is a transformative teaching method that fosters collaboration, critical thinking, and active participation (Alsolais, 2024).

Tokac et al. (2025) employed an explanatory sequential mixed-methods design to evaluate TPS in online biostatistics courses for graduate nursing students (N = 79). Quantitative analysis revealed that response accuracy improved from 82.0% during the individual "Think" phase to 90.3% following the "Share" phase, with a significant link between progressing from the Think to Share step and response accuracy ($\chi^2(1) = 12.688, P < .001$). Qualitative feedback highlighted increased comprehension, course satisfaction, and appreciation for collaborative learning, leading the authors to conclude that TPS enhances both learning outcomes and student engagement (Tokac et al., 2025).

Li et al. (2024) investigated the application of TPS combined with microlecture teaching in general surgery nursing education. The study demonstrated that the integrated TPS-microlecture model significantly improved nursing students' theoretical knowledge and clinical reasoning skills compared to traditional teaching methods, suggesting that TPS can be effectively combined with technology-enhanced learning approaches to maximise educational outcomes.

Cooperative Learning and Academic Achievement in Nursing

Meta-analytic evidence supports the broader effectiveness of cooperative learning in nursing education. Ozkan et al. (2024) conducted a systematic review and meta-analysis of 11 studies across six countries examining the Jigsaw cooperative learning technique in nursing education. The analysis revealed that the Jigsaw technique positively affected academic achievement, skills, and attitudes among nursing students, with improvements observed in interpersonal relations, critical thinking, communication, and clinical skills (Ozkan et al., 2024). While Jigsaw differs from TPS in structure, both share the core cooperative learning principles of positive interdependence and individual accountability, suggesting that the benefits

observed for Jigsaw may extend to other cooperative structures such as TPS.

Dorri et al. (2024) examined nursing students' perceptions of the effect of cooperative learning on academic achievement and learning environment using a mixed-methods sequential explanatory design. The study found a significant difference between the academic achievement of students in the experimental and control groups in favour of cooperative learning. Students' experiences indicated that cooperative learning not only creates a secure environment and enhances deep learning and motivational processes but also increases instructor support and provides equal opportunities for student involvement. The findings illuminated the role of social interdependence theory in helping students connect with each other to promote learning (Dorri et al., 2024).

Abobaker et al. (2023) investigated the impact of the Jigsaw cooperative learning strategy on academic achievement and opinions among nursing students. The study demonstrated that cooperative learning strategies significantly improved academic achievement compared to traditional lecture-based methods, with students expressing positive opinions about the collaborative learning experience.

Classroom Engagement in Nursing Education

Classroom engagement is a multidimensional construct encompassing behavioural, emotional, and cognitive dimensions. In nursing education, engagement is critical because it predicts academic performance, retention, and the development of professional competencies (Lan et al., 2024). Traditional lecture-based instruction often fails to sustain high levels of engagement, particularly in large classes where student-faculty interaction is limited. Active learning strategies such as TPS have been shown to increase student engagement by promoting peer interaction, immediate feedback, and active cognitive processing (Tokac et al., 2025).

Lan et al. (2024) conducted a quasi-experimental study with 192 fourth-year nursing students in

Vietnam to examine the effects of team-based learning on classroom engagement and learning outcomes. The findings revealed that students in the team-based learning group had significantly higher scores on classroom engagement and more positive attitudes toward learning than those in traditional classes (Lan et al., 2024). Although the intervention was team-based learning rather than TPS, the underlying mechanisms of collaborative engagement are similar, supporting the theoretical rationale for expecting TPS to enhance classroom engagement.

Hassan and Shazly (2022) examined the relationship between civility behaviour and classroom engagement among nursing students, finding that a positive classroom environment and respectful peer interactions significantly enhanced students' engagement levels. These findings suggest that the structured, respectful interaction patterns inherent in TPS may contribute to improved classroom engagement by fostering a supportive learning climate.

The literature consistently demonstrates that TPS and other cooperative learning strategies improve critical thinking, academic achievement, and engagement in nursing education (Alsolais, 2024; Dorri et al., 2024; Ozkan et al., 2024; Tokac et al., 2025). However, most studies have been conducted in Western, Middle Eastern, or Southeast Asian contexts, with limited evidence from Pakistan. Given the unique cultural, institutional, and resource-related factors that characterise nursing education in Pakistan, context-specific research is needed. This study addresses this gap by evaluating TPS at Nishtar College of Nursing, NMU Multan, thereby contributing to the local evidence base and informing pedagogical practice.

Methodology

Research Design

A quasi-experimental pretest-posttest control group design was employed to evaluate the effectiveness of the Think-Pair-Share cooperative learning strategy. This design was selected because it allows for comparison between an experimental

group receiving the intervention and a control group receiving traditional instruction, while accommodating the practical constraints of conducting research in an educational setting where random assignment is not feasible (Alsolais, 2024).

Setting and Participants

The study was conducted at Nishtar College of Nursing, Nishtar Medical University (NMU), Multan, Pakistan. The target population comprised undergraduate nursing students enrolled in the Bachelor of Science in Nursing (BSN) programme. A total of 120 students were recruited, with 60 students assigned to the experimental group and 60 students assigned to the control group. Participants were selected using purposive sampling based on inclusion criteria: (a) enrolment in the second year of the BSN programme, (b) willingness to participate, and (c) no prior exposure to the TPS strategy in formal classroom settings.

Intervention

The experimental group received instruction through the TPS strategy over a period of eight weeks. Each TPS session followed the three-phase structure: (1) **Think** students were presented with a question or problem and given 2–3 minutes to think individually; (2) **Pair** students were paired with a partner to discuss their responses for 3–5 minutes; and (3) **Share** pairs shared their conclusions with the whole class, facilitated by the instructor (Tokac et al., 2025). The control group received traditional lecture-based instruction covering identical content during the same period. Both groups were taught by the same instructors to minimise instructor-related confounding variables.

Instruments

Classroom Engagement Survey (CES): Classroom engagement was measured using the Classroom Engagement Survey, a validated instrument adapted from previous studies (Lan et al., 2024). The CES consists of 15 items rated on a 5-point

Likert scale (1 = strongly disagree to 5 = strongly agree), covering behavioral, emotional, and cognitive engagement dimensions. The instrument demonstrated good internal consistency in the present study (Cronbach's $\alpha = 0.87$).

Learning Outcome Test: Learning outcomes were assessed using a researcher-developed knowledge test comprising 40 multiple-choice questions based on the course content. The test was validated by a panel of five nursing education experts, and its reliability was established through a pilot study (KR-20 = 0.82).

Data Collection Procedure

Data were collected at two time points: pre-intervention (baseline) and post-intervention (after eight weeks). Both groups completed the CES and the knowledge test at both time points. The pretest was administered in the first week of the semester, and the posttest was administered in the ninth week following the intervention period. All data collection was conducted in classroom settings under the supervision of the researchers.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) of Nishtar Medical University, Multan. Written informed consent was obtained from all participants prior to data collection. Participants were assured of confidentiality, anonymity, and their right to withdraw from the study at any time without academic penalty.

Data Analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics (means, standard deviations, frequencies) were computed for all variables. Independent samples t-tests were used to compare post-intervention scores between the experimental and control groups. Paired samples t-tests were used to assess within-group changes from pretest to posttest. A p-value of $< .05$ was considered statistically significant.

Results

Demographic Characteristics

Table 1 presents the demographic characteristics of the study participants. The experimental and control groups were comparable in terms of age, gender, and prior academic performance, with no statistically significant differences at baseline.

Table 1: Demographic Characteristics of Participants

Characteristic	Experimental Group (n = 60)	Control Group (n = 60)	p-value
Age (years), M $\pm$ SD	20.45 $\pm$ 1.23	20.38 $\pm$ 1.31	.76
Gender, n (%)			.82
Male	15 (25.0)	14 (23.3)	
Female	45 (75.0)	46 (76.7)	
Prior GPA, M $\pm$ SD	3.42 $\pm$ 0.38	3.39 $\pm$ 0.41	.68

Baseline Comparability

Table 2 presents the baseline (pretest) scores for classroom engagement and learning outcomes. Independent samples t-tests confirmed no

statistically significant differences between the groups at baseline, indicating comparability prior to the intervention.

Table 2: Baseline (Pretest) Scores for Classroom Engagement and Learning Outcomes

Variable	Experimental Group (n = 60) M ± SD	Control Group (n = 60) M ± SD	t(118)	p-value
Classroom Engagement	2.98 ± 0.52	3.02 ± 0.49	0.44	.66
Learning Outcomes	58.32 ± 8.45	57.89 ± 8.72	0.28	.78

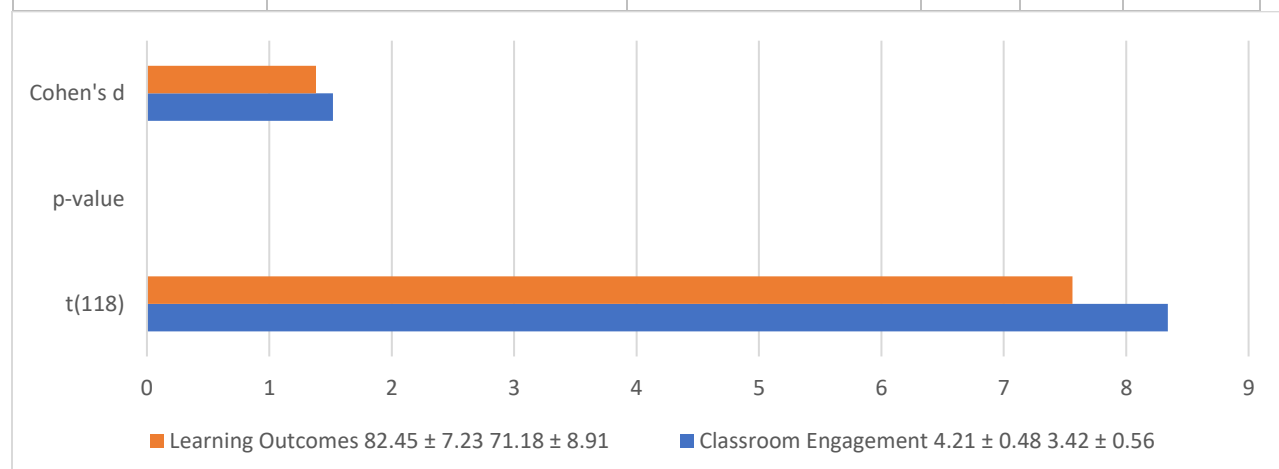
Post-Intervention Results

Table 3 presents the post-intervention scores for both groups. The experimental group demonstrated significantly higher classroom engagement scores (M = 4.21, SD = 0.48) compared to the control group (M = 3.42, SD =

0.56), with $t(118) = 8.34$, $p < .001$. Similarly, learning outcome scores were significantly higher in the experimental group (M = 82.45, SD = 7.23) than in the control group (M = 71.18, SD = 8.91), $t(118) = 7.56$, $p < .001$.

Table 3: Post-Intervention Scores for Classroom Engagement and Learning Outcomes

Variable	Experimental Group (n = 60) M ± SD	Control Group (n = 60) M ± SD	t(118)	p-value	Cohen's d
Classroom Engagement	4.21 ± 0.48	3.42 ± 0.56	8.34	< .001	1.52
Learning Outcomes	82.45 ± 7.23	71.18 ± 8.91	7.56	< .001	1.38



Within-Group Changes

Table 4 presents the within-group changes from pretest to posttest. Both groups showed significant

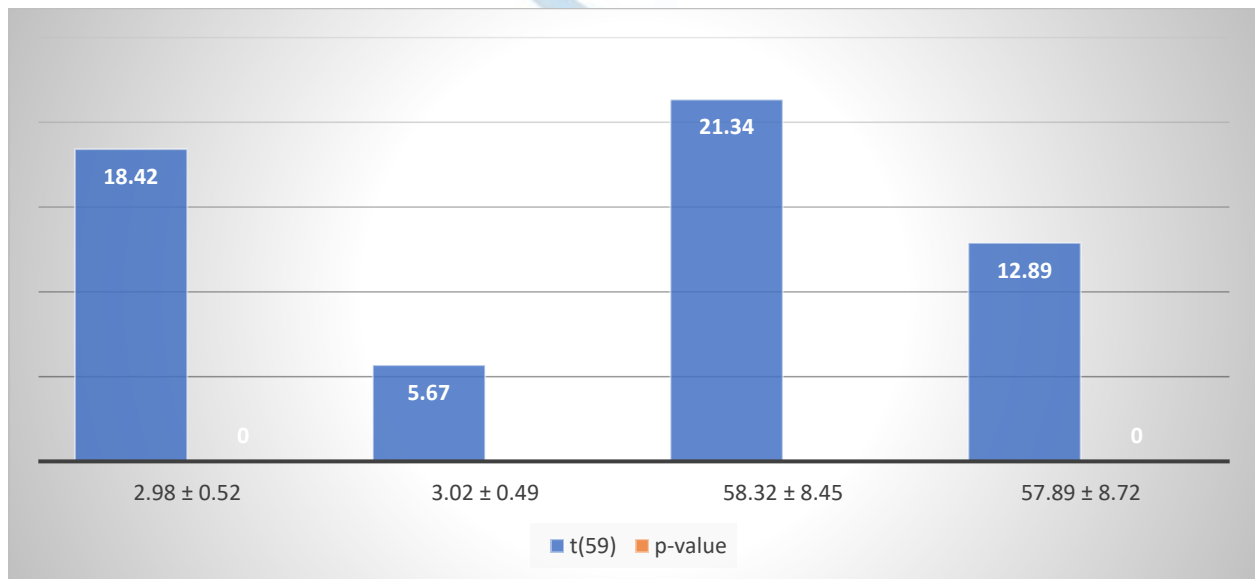
improvement; however, the experimental group demonstrated substantially greater gains in both classroom engagement and learning outcome.

Table 4: Within-Group Pretest–Posttest Changes

Variable	Group	Pretest M ± SD	Posttest M ± SD	t(59)	p-value
Classroom Engagement	Experimental	2.98 ± 0.52	4.21 ± 0.48	18.42	< .001
Classroom Engagement	Control	3.02 ± 0.49	3.42 ± 0.56	5.67	< .001
Learning Outcomes	Experimental	58.32 ± 8.45	82.45 ± 7.23	21.34	< .001
Learning Outcomes	Control	57.89 ± 8.72	71.18 ± 8.91	12.89	< .001

The results provide strong support for both hypotheses. The experimental group, which received instruction through the TPS strategy, demonstrated significantly higher classroom engagement and learning outcome scores compared to the control group. The effect sizes (Cohen's $d = 1.52$ for engagement and $d = 1.38$ for learning outcomes) indicate large practical significance, suggesting that the TPS intervention had a substantial impact on student outcomes.

These findings are consistent with previous research demonstrating the effectiveness of TPS and cooperative learning strategies in nursing education (Alsolais, 2024; Tokac et al., 2025). The large effect sizes observed in this study may be attributed to the structured nature of the TPS intervention, which ensured that all students actively participated in the learning process rather than passively receiving information.



Discussion

The present study aimed to evaluate the effectiveness of the Think–Pair–Share cooperative learning strategy on classroom engagement and learning outcomes among undergraduate nursing students at Nishtar College of Nursing, NMU

Multan. The findings demonstrated that students in the experimental group achieved significantly higher classroom engagement and learning outcome scores compared to those in the control group, providing strong support for the effectiveness of TPS in this context.

Classroom Engagement

The significant improvement in classroom engagement observed in the experimental group aligns with previous research on cooperative learning in nursing education (Wu et al., 2026). Tokac et al. (2025) reported that TPS enhanced student engagement in online biostatistics courses, with qualitative feedback highlighting increased comprehension and satisfaction. Similarly, Lan et al. (2024) found that team-based learning, which shares core principles with TPS, significantly improved classroom engagement among Vietnamese nursing students. The structured nature of TPS—requiring every student to think individually, discuss with a partner, and share with the class—ensures active participation and accountability, which are key drivers of classroom engagement (Dorri et al., 2024).

The large effect size for classroom engagement (Cohen's $d = 1.52$) suggests that TPS may be particularly effective in contexts where traditional lecture-based instruction dominates, as is common in Pakistani nursing education (Khan et al., 2023). By breaking the class into manageable interactive phases, TPS addresses the engagement challenges associated with large class sizes and limited student-faculty interaction.

The significant improvement in learning outcomes in the experimental group is consistent with the findings of Alsolais (2024), who reported that TPS significantly enhanced drug dosage calculation skills among nursing students, with posttest scores increasing from 11.21 to 21.18. The effect size observed in the present study (Cohen's $d = 1.38$) indicates a substantial practical impact on learning outcomes.

Several mechanisms may explain why TPS enhanced learning outcomes in this study. First, the "Think" phase provides students with time to process information individually, reducing cognitive load and improving the quality of their responses (Tokac et al., 2025). Second, the "Pair" phase facilitates peer scaffolding, allowing students to clarify misconceptions and deepen their understanding through dialogue (Dorri et al., 2024). Third, the "Share" phase provides

opportunities for validation and reinforcement, as students receive feedback from peers and instructors. These mechanisms align with Vygotsky's sociocultural theory and social interdependence theory, which emphasise the role of social interaction in cognitive development (Ozkan et al., 2024).

The findings of this study are consistent with the broader meta-analytic evidence on cooperative learning in nursing education. Ozkan et al. (2024) found that the Jigsaw cooperative learning technique positively affected academic achievement, skills, and attitudes among nursing students. Dorri et al. (2024) reported that cooperative learning improved academic achievement and created a more supportive learning environment. The present study extends these findings by demonstrating that TPS, a specific cooperative learning strategy, is effective in the Pakistani nursing education context.

The findings have several implications for nursing education practice in Pakistan. First, TPS is a low-cost, scalable strategy that can be implemented in large classes without requiring significant resources or technology. This makes it particularly suitable for resource-constrained settings such as Nishtar College of Nursing. Second, TPS addresses the need for active learning strategies that develop critical thinking and communication skills—competencies essential for professional nursing practice (Alsolais, 2024). Third, the structured nature of TPS ensures that all students, including those who are less confident or less vocal, have opportunities to participate and contribute.

Limitations

Several limitations of this study should be acknowledged. First, the use of a quasi-experimental design rather than random assignment may introduce selection bias, although baseline comparability was confirmed. Second, the study was conducted at a single institution, which may limit the generalizability of the findings to other nursing colleges in Pakistan. Third, the duration of the intervention (eight weeks) may not

be sufficient to capture long-term retention of learning outcomes. Fourth, the study relied on self-reported measures for classroom engagement, which may be subject to social desirability bias. Finally, the researcher-developed knowledge test, while validated, may not fully capture the complexity of learning outcomes in nursing education.

Recommendations for Future Research

Future research should address these limitations by employing randomized controlled designs, multi-institutional samples, and longer intervention periods. Additionally, qualitative studies exploring students' and instructors' experiences with TPS would provide deeper insights into the mechanisms underlying its effectiveness. Comparative studies examining TPS against other active learning strategies would help identify the most effective approaches for different educational contexts.

Conclusion

The Think-Pair-Share cooperative learning strategy significantly enhanced classroom engagement and learning outcomes among undergraduate nursing students at Nishtar College of Nursing, NMU Multan. The experimental group demonstrated substantially higher engagement and achievement scores compared to the control group, with large effect sizes indicating practical significance. These findings support the integration of TPS into nursing curricula as a low-cost, scalable strategy to promote active learning and improve academic performance. Given the growing demand for nursing graduates who are critical thinkers, effective communicators, and collaborative practitioners, TPS offers a promising pedagogical approach for nursing education in Pakistan and similar contexts.

Limitations

1. Quasi-experimental design: The absence of random assignment may introduce selection bias, although baseline comparability was confirmed.

2. Single institution: The study was conducted at one nursing college, limiting generalizability.

3. Short intervention duration: The eight-week intervention may not capture long-term retention.

4. Self-reported engagement: Classroom engagement was measured through self-report, which may be subject to bias.

5. Researcher-developed test: The knowledge test, while validated, may not fully capture all dimensions of learning outcomes.

Outcome Utilization

The findings of this study can be utilized in the following ways:

1. Curriculum integration: Nursing educators at Nishtar College of Nursing and other institutions can incorporate TPS into lesson plans to enhance student engagement and learning.

2. Faculty development: Training programmes can be developed to equip nursing faculty with the skills to implement TPS effectively.

3. Policy recommendations: Nursing education regulatory bodies in Pakistan can consider including cooperative learning strategies in curriculum frameworks.

4. Evidence base: The study contributes to the growing body of evidence on active learning in nursing education, particularly in the Pakistani context.

5. Further research: The findings can inform the design of larger, multi-institutional studies to validate and extend the results.

REFERENCES

- Abobaker, R.M., Alamri, M.S., Alshaery, B. and Hamdan-Mansour, A.M. (2023) 'Impact of Jigsaw cooperative learning strategy on academic achievement and opinion among nursing students', *Journal of Holistic Nursing and Midwifery*, 33(1), pp. 43–51.
- Alsolais, A.M. (2024) 'Effectiveness of the Think-Pair-Share strategy in enhancing drug dosage calculation skills among student nurses in a public university in Saudi Arabia: An experimental study', *Journal of Healthcare Administration*, 3(2), pp. 176–187.

- Dorri, R., Al-Hassan, M., Al-Omari, E. and Blanco, M. (2024) 'Perceptions of nursing students on the effect of cooperative learning on academic achievement and learning environment', *Interactive Learning Environments*, 31(10), pp. 6724-6734.
- Farooq, S., Khan, M. and Ahmed, A. (2022) 'Faculty perception about active learning strategies: A cross-sectional survey', *Journal of Pakistan Medical Association*, 72(9), pp. 1802-1807.
- Hassan, E.M. and Shazly, M.M. (2022) 'Relationship between civility behavior and classroom engagement among nursing students', *Egyptian Journal of Nursing*, 18(1), pp. 45-53.
- Khan, S., Rehman, R. and Ali, S. (2023) 'The perception and experience of nursing students regarding the use of active learning strategies in Karachi, Pakistan', *Pakistan Journal of Nursing*, 15(2), pp. 22-30.
- Lan, D.T.N., An, L.V., Binh, H.D., Trang, D.N.D., Vu, P.T.T., Son, N.T., Phuc, D.T.T. and Hoa, D.D. (2024) 'Enhancing learning, classroom engagement, and attitude through team-based learning among Vietnamese nursing students: A quasi-experimental study', *Pacific Rim International Journal of Nursing Research*, 28(4), pp. 885-897.
- Li, Y., Sun, P., Wang, F., Yang, Y., Song, X. and Sun, W. (2024) 'Application of TPS combined with microlecture teaching model in nursing teaching of general surgery', *Chinese Journal of Medical Education Research*, 23(5), pp. 692-697.
- Ozkan, S., Uslusoy, E. and Kaya, N. (2024) 'Outcomes of jigsaw technique in nurse education: A systematic review and meta-analysis', *Nurse Education in Practice*, 76, p. 103902.
- Tokac, U., McKeever, S., Aktar, M., Razon, S. and Werner, K. (2025) 'Enhancing biostatistics skills in online nursing education through the Think-Pair-Share approach', *Nurse Educator*, 50(6), pp. 312-317.
- KOMBAT, A., ASIGRI, V. N., AMANYI, C. K., ATEPOR, S., ADUGBIRE, J. A., AKWENSI, V. K. & APARA, M. B. 2023. Determining the most effective stage of the Think-Pair-Share teaching strategy. *British Journal of Education, Learning and Development Psychology*, 6, 7-24.
- LI, M.-M. & TU, C.-C. 2024. Developing a project-based learning course model combined with the think-pair-share strategy to enhance creative thinking skills in education students. *Education Sciences*, 14, 233.
- WU, T.-T., HAPSARI, I. P. & HUANG, Y.-M. 2026. Effects of incorporating AI chatbots into think-pair-share activities on EFL speaking anxiety, language enjoyment, and speaking performance. *Computer Assisted Language Learning*, 39, 1408-1446.