

Changes in Fourth-Grade Students' Communication Skills After Word Square Learning at SD Negeri Kayee Lee

Mismar Al-Fariesy¹, Dian Aswita², Muhammad Isa^{3*}

^{1,2,3}Physics Education, FKIP, Universitas Serambi Mekkah, Aceh, Indonesia

Email: ¹mismar80@gmail.com; ²dian.aswita@unm.ac.id; ³muhammadisa@serambimekkah.ac.id

ABSTRACT

Elementary classrooms require students to communicate ideas, respond to peers, and participate in discussion, yet preliminary classroom observation at SD Negeri Kayee Lee indicated that instruction was largely one-way and that several fourth-grade students were reluctant to speak. This study examined changes in students' communication skill scores after learning with the Word Square model. A pre-experimental one-group pretest–posttest design involved all 31 fourth-grade students at the school. Pretest and posttest scores were compared using a paired-samples t-test. The mean score increased from 65.32 before instruction to 82.45 afterward, a mean increase of 17.13 points. The difference was statistically significant, $t(30) = -10.532$, $p < .001$, with an estimated 95% confidence interval of 13.81–20.45 points and a large within-participant standardized change ($d_z = 1.89$). These findings show a substantial score change during the intervention period; however, the absence of a comparison group prevents the change from being attributed exclusively to Word Square learning. The findings should be interpreted in light of incomplete instrument documentation, limited intervention detail, and the exclusion of unverifiable observation scores.

Keywords: Word Square; Communication skills; Elementary education; Pretest–Posttest; Classroom interaction

1. INTRODUCTION

Communication is central to elementary learning because students are expected to ask questions, explain ideas, respond to classmates, and negotiate meaning during classroom activity. Preliminary observation conducted at SD Negeri Kayee Lee in August 2024 indicated a predominantly one-way pattern of instruction: the teacher explained content while students listened, and several students appeared reluctant to express opinions or participate in discussion. This local situation makes the development of classroom communication an immediate pedagogical concern.

Learning models that organize interaction can create more opportunities for students to verbalize ideas. Word Square combines question prompts with a letter grid in which students identify relevant terms, and it can be implemented through individual or collaborative problem solving (Huda, 2013). Cooperative organization is relevant because it deliberately distributes learning activity among peers (Putra, 2021), and structured peer activity can support elementary students' communication and collaboration (Nath & Ross, 2001), while cooperative speaking tasks have also been associated with better speaking performance among fourth-grade students (Pramesti & Kristiantari, 2023). These studies clarify the interactional mechanism that makes Word Square plausibly relevant to classroom communication; they do not prove an effect in the present setting.

Empirical studies show a trend toward using Word Square for cognitive learning outcomes (Abidin et al., 2021; Ambaretno, 2024; Khairunnisa & Supriansyah, 2022; Maulidiah et al., 2024), vocabulary development (Rachma et al., 2023; Salsabila et al., 2022), reading (Shafwan & Laisa, 2025), and learning activity (Ilmi et al., 2024). This literature concentrates on subject-specific achievement, vocabulary, reading, or participation rather than directly testing oral communication

* Corresponding author: muhammadisa@serambimekkah.ac.id

Citation: Al-Fariesy, M., Aswita, D., & Isa, M. (2026). Changes in Fourth-Grade Students' Communication Skills After Word Square Learning at SD Negeri Kayee Lee. *Journal of Educational Innovation in Science and Technology*, 1(1), 20–24.

with a documented communication rubric. In Aceh, educational innovation research has also examined the feasibility of Moodle-based learning for prospective elementary teachers (Rizal & Walidain, 2019), but that work concerns higher-education learning media rather than elementary classroom communication. The gap is therefore outcome- and context-specific, not a claim that Word Square has never been studied.

A score increase in a single group cannot by itself distinguish an intervention effect from maturation, testing, history, or other concurrent influences (Knapp, 2016). This methodological limitation must be made explicit when the findings are interpreted. The present study consequently treats the observed difference as within-group change, not as definitive evidence of effectiveness.

This study asked: How did fourth-grade students' communication skill scores change between the pretest and posttest administered around Word Square learning at SD Negeri Kayee Lee? The study advances the provisional argument that Word Square activities coincided with a meaningful improvement in communication scores during the study period. The argument concerns measured change, not definitive causation, because the design did not include a comparison group.

2. METHODS

Research design. This study used a quantitative, pre-experimental one-group pretest–posttest design (Sugiyono, 2016). Communication skills were measured before and after Word Square learning in the same group. This design permits estimation of within-group change but does not provide the counterfactual needed for a causal claim.

Participants and setting. The population comprised 31 fourth-grade students at SD Negeri Kayee Lee, Blang Bintang District, Aceh Besar Regency, Indonesia, and all 31 students were included as the study sample. The analysis used complete paired scores from the 31 participating students.

Intervention. Students participated in classroom learning organized through the Word Square model, using question prompts and a letter grid to identify relevant concepts and support discussion.

Measures and data collection. Communication skills were assessed before and after the learning period through pretest and posttest scores. A student-behavior observation checklist was also administered, but its scoring documentation was insufficient for the resulting percentage to be included in the analysis.

Data analysis. Pretest and posttest scores were summarized using means and compared using paired-sample t-tests at a significance level of 0.05. Mean differences were calculated by subtracting pretest scores from posttest scores. The magnitude of change was further examined using 95% confidence intervals and within-participant effect sizes (d_z), which were calculated from the reported mean differences, sample sizes, and t-values. Although initial analysis indicated that a test for normality had been performed, corresponding test statistics and significance values were not available. Therefore, the assumption of normality could not be independently assessed in this study.

3. RESULTS

The descriptive and paired-test results are reported below. Because individual-level raw data were unavailable, the confidence interval and d_z were reconstructed from the reported summary statistics.

Table 1. Students' Responses to the Application of the Ethnoscience Approach

No.	Measure	N	Mean
1	Pretest	31	65.32
2	Posttest	31	82.45

The mean score increased by 17.13 points, from 65.32 at pretest to 82.45 at posttest.

Table 2. Paired-Samples Test and Reconstructed Effect Estimate

Comparison	Mean change	t	df	p	95% CI	d_z
Posttest – pretest	17.13	10.532	30	< .001	[13.81, 20.45]	1.89

The paired-samples test showed a statistically significant difference, $t(30) = -10.532$, $p < .001$, when the original analysis was oriented as pretest minus posttest. Expressed as posttest minus pretest, the estimated mean increase was 17.13 points (95% CI [13.81, 20.45]), with $d_z = 1.89$. The effect estimate is descriptive of within-group change and must not be interpreted as a causal treatment effect.

4. DISCUSSION

Students' communication scores improved considerably during the study. The average posttest score was 17.13 points higher than the pretest score, and the paired-samples analysis showed that this difference was statistically significant. The magnitude of the standardized change was also large. These findings indicate a substantial improvement within the group during the implementation of Word Square learning. Nevertheless, because the study did not include a comparison group, the improvement cannot be attributed solely to the learning model.

This improvement is educationally meaningful in the context of SD Negeri Kayee Lee, where preliminary observations indicated limited student participation and a predominantly teacher-directed learning process. Word Square provided students with a structured activity in which they could identify relevant terms, compare answers, and explain their reasoning. Such activities may encourage students who are usually reluctant to speak to become more involved in classroom interaction. The findings are consistent with previous studies reporting improvements in learning outcomes following the use of Word Square (Abidin et al., 2021; Ambaretno, 2024; Khairunnisa & Supriansyah, 2022; Maulidiah et al., 2024). Other studies have associated the model with greater classroom participation (Ilmi et al., 2024) and improvements in vocabulary and reading skills (Rachma et al., 2023; Salsabila et al., 2022; Shafwan & Laisa, 2025). Although these studies investigated different outcomes and educational settings, they suggest that Word Square can support forms of learning activity that involve attention, participation, and verbal engagement.

One possible explanation for the observed improvement lies in the interaction created by the learning activity. The letter grid directs students' attention to key terms, while the process of discussing answers gives them opportunities to recall information, formulate explanations, and respond to their peers. Research on peer tutoring and cooperative speaking activities similarly indicates that structured interaction can support the development of students' communication behaviours (Nath & Ross, 2001; Pramesti & Kristiantari, 2023). In the present study, however, this explanation should be understood as a plausible interpretation rather than a directly tested mechanism. The quality of classroom interaction and the frequency of student participation were not measured using a validated instrument. Other factors, including familiarity with the assessment, students' development during the study period, differences in teacher support, and events occurring alongside the intervention, may also have contributed to the change. These possibilities are particularly relevant in a one-group pretest–posttest design (Knapp, 2016).

Several limitations should therefore be considered when interpreting the findings. The study involved a relatively small sample from a single school, which limits the extent to which the results can be generalized to other students and educational settings. The intervention procedures were not documented in sufficient detail, and evidence concerning instrument validity, reliability, and inter-rater agreement was unavailable. The observation percentage could not be verified from the reported scoring procedure, while the normality-test statistic was not included in the available statistical output. Future studies should employ a validated communication-skills rubric, involve trained independent raters, and describe the intervention procedures in sufficient detail to allow replication. The use of a comparison group, or preferably a randomized design where feasible, would provide stronger evidence regarding the contribution of Word Square learning. A larger multisite sample would also help determine whether similar patterns occur across different school contexts.

5. CONCLUSION

Fourth-grade students at SD Negeri Kayee Lee obtained higher communication-skill scores after the Word Square learning period than before it. The 17.13-point mean increase was statistically significant and represented a large within-participant standardized change. The study contributes preliminary, context-specific evidence that Word Square learning coincided with improved scores, but the one-group design, incomplete instrument evidence, and unresolved observation calculation prevent a causal conclusion. A controlled study with transparent intervention procedures and validated measurement is required to determine whether the model itself produces the improvement.

REFERENCES

- Abidin, Z., Ramadhan, G. M., & Kusniawati, R. (2021). Pengaruh model pembelajaran Word Square terhadap hasil belajar IPS siswa sekolah dasar. *COLLASE (Creative of Learning Students Elementary Education)*, 4(5). <https://doi.org/10.22460/collase.v4i5.8826>
- Ambaretno, D. A. (2024). The use of Word Square learning model to improve student learning outcomes in Theme 6 lessons in Class III of Elementary School 054938, Langkat Regency. *Indonesian Journal Education*, 3(3), 97–101. <https://doi.org/10.56495/ije.v3i3.958>
- Huda, M. (2013). Model-model pengajaran dan pembelajaran: Isu-isu metodis dan paradigmatis. Pustaka Pelajar.
- Ilmi, N., Halik, A., & Hajar, S. (2024). Penerapan model pembelajaran Word Square untuk meningkatkan keaktifan belajar siswa pada materi iklan kelas V UPT SD Negeri 237 Pinrang. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 9(4). <https://doi.org/10.23969/jp.v9i04.19730>
- Khairunnisa, D. P., & Supriansyah, S. (2022). Pengaruh model pembelajaran Word Square berbantu video pembelajaran terhadap hasil belajar kognitif pada siswa sekolah dasar. *Jurnal Basicedu*, 6(4), 7426–7432. <https://doi.org/10.31004/basicedu.v6i4.3539>
- Knapp, T. R. (2016). Why is the one-group pretest–posttest design still used? *Clinical Nursing Research*, 25(5), 467–472. <https://doi.org/10.1177/1054773816666280>
- Maulidiah, P., Simbolon, N., Gultom, I., Irsan, I., & Tambunan, H. P. (2024). Pengaruh model pembelajaran Word Square berbasis saintifik terhadap hasil belajar IPAS siswa kelas V. *Jurnal Merah Putih Sekolah Dasar*, 1(6), 259–268. <https://doi.org/10.24114/jmpsd.v1i6.59160>
- Nath, L. R., & Ross, S. M. (2001). The influence of a peer-tutoring training model for implementing cooperative groupings with elementary students. *Educational Technology Research and Development*, 49, 41–56. <https://doi.org/10.1007/BF02504927>
- Pramesti, N. M. N., & Kristiantari, M. G. R. (2023). The Think Pair Share cooperative learning model assisted by children's story text improves speaking skills. *MIMBAR PGSD Undiksha*, 11(2). <https://doi.org/10.23887/jjpgsd.v11i2.61516>
- Putra, A. (2021). Penerapan model pembelajaran kooperatif tipe jigsaw untuk sekolah dasar. Jakad Media Publishing.
- Rachma, A. M., Maufur, S., & Ummah, I. (2023). Pengaruh penggunaan model pembelajaran Word Square terhadap penguasaan kosakata bahasa Inggris siswa kelas IV madrasah ibtidaiyah. *Indonesian Journal of Elementary Education*, 5(2). <https://doi.org/10.24235/ijee.v5i2.13714>
- Rizal, S., & Walidain, B. (2019). Pembuatan media pembelajaran e-learning berbasis Moodle pada matakuliah Pengantar Aplikasi Komputer Universitas Serambi Mekkah. *Jurnal Ilmiah Didaktika*, 19(2), 178–192. <https://doi.org/10.22373/jid.v19i2.5032>
- Salsabila, R., Saputra, E. R., & Indihadi, D. (2022). Application of Word Square and Scramble Sentence learning model to improve English vocabulary for elementary school students. *LITE: Jurnal Bahasa, Sastra, dan Budaya*, 18(2). <https://doi.org/10.33633/lite.v18i2.5713>

- Shafwan, R., & Laisa, N. (2025). Meningkatkan keterampilan membaca intensif melalui model Word Square pada siswa kelas V sekolah dasar. *LANGUAGE: Jurnal Inovasi Pendidikan Bahasa dan Sastra*, 5(2), 163–169. <https://doi.org/10.51878/language.v5i2.5808>
- Sugiyono. (2016). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.