Implementation of Multi-Strategy Blended Learning Approach to Enhance Elementary Students' Communication Skills and Academic Achievement

Darrsan[1],

[1]Universitas PGRI Argopuro Jember

[1]Dr.darsanafidar@gmail.com,

Abstract

This study investigates the effectiveness of a multi-strategy blended learning approach in enhancing elementary students' communication skills and academic achievement in East Java, Indonesia. Employing a quasi-experimental design with pre-test–post-test control group, 120 students (Grades 4–6) participated in a 12-week intervention combining inquiry-based discovery, small-group discussion, role-play, simulation, and collaborative learning activities. The pedagogical framework is grounded in social constructivism, where knowledge construction occurs through peer interaction, authentic problem-solving, and scaffolded digital environments that foster both cognitive and social development. Quantitative data were collected through standardized assessments of communication skills, learning engagement, and academic achievement, while qualitative insights were obtained from teacher observations and student reflections. Data analysis using SPSS 26+ included paired-sample and independent-sample t-tests, as well as ANCOVA to control for pre-test differences. Results demonstrated significant improvements in the experimental group across all measures: communication skills showed large effect sizes (Cohen's d = 2.08), academic achievement improved substantially (d = 1.51), and learning engagement increased markedly (d = 3.11). ANCOVA confirmed significant group differences (p < .001, η^2 = .362), indicating that the intervention accounted for 36% of variance in outcomes. These findings contribute to international literature by demonstrating how strategic integration of blended learning can address pedagogical challenges in resource-constrained elementary contexts within developing regions, where traditional teacher-centered approaches remain prevalent. The study extends existing blended learning frameworks by providing empirical evidence of multi-strategy integration in primary education settings characterized by limited digital infrastructure and diverse student readiness levels.

Practical implications emphasize the need for sustained teacher professional development in facilitating active learning strategies, institutional investment in digital literacy support for both educators and students, and contextual adaptation of pedagogical approaches to ensure equitable implementation across schools with varying resource availability and technological capacity.

Keywords: blended learning, multi-strategy approach, communication skills, academic achievement, elementary education

Introduction

Changes to the education system in Indonesia due to the COVID-19 pandemic have also affected elementary schools in East Java, especially in terms of the quality of student communication and academic achievement. (Rahmasiwi et al., 2023) In addition, the profile of home learning in rural areas, particularly in Jember, East

Java, reveals that home learning and hybrid learning processes are implemented, but participation rates are relatively low due to various technical and local cultural constraints. (Miftakhuddin et al., 2022). This condition shows that while there are blended/hybrid learning initiatives, there are gaps that have not been systematically addressed, especially in the dimensions of communication and verbal interaction of students..

Academically and competitively, elementary school students in East Java also show encouraging achievements on a national scale: official data shows that in 2024 students from various levels (including elementary school) from East Java managed to win 5,098 medals in national-level achievement competitions, making this province one of the regions with high student talent achievements.(Safitri et al., 2025) However, these competitive achievements do not directly indicate that all elementary school students in East Java have strong communication skills and equal academic achievement, especially after the disruption of face-to-face learning due to the pandemic, which many suspect has widened inequalities in learning and communication abilities..

On the pedagogical side, several local studies indicate that blended learning has been implemented in elementary schools in East Java, but still faces significant obstacles. For example, in Madiun Regency, the blended learning model impacted students' digital literacy, but speaking skills and oral communication practice were not a primary focus of the study(Rahmasiwi et al., 2023). In Sidoarjo district, there is also a study at the MTs level which shows that the use of educational platforms increases student engagement, time flexibility, and access to materials, but technological readiness and teacher capacity in managing the platform are still major obstacles..(Yusra & Sesmiarni, 2025) Thus, although digital and blended learning aspects are starting to develop in East Java, the role of specific multi-component strategies in developing oral communication and interaction has not been widely researched.

The main issues underlying the research in East Java are: (1) the gap in elementary school students' oral communication skills arising from the online or hybrid learning period without a focus on verbal practice and intensive peer interaction; (2) variability in the readiness of infrastructure and technology resources between schools, especially in rural and remote areas in East Java; (3) the lack of experimental or quasi-experimental research in East Java that combines several blended instructional strategies to measurably improve both communication skills and student academic achievement; and (4) the real need for teachers and schools in East Java for effective implementation guidelines so that communication skills and student achievement can improve simultaneously and evenly..

Therefore, this study aims to design, implement, and evaluate a Multi-Strategy Blended Learning Approach in elementary schools in East Java, which combines online collaborative activities, oral micro-teaching modules, structured peer feedback, and face-to-face practice emphasizing verbal communication. The primary outcomes measured are students' verbal communication skills and academic achievement. The expected theoretical benefits are to enrich the blended learning literature in the East Java context with empirical data on oral communication strategies and to provide a model that considers local readiness. Practically, the research results are expected to produce learning design guidelines for elementary school teachers in East Java, teacher professional development strategies, and regional policy recommendations so that post-pandemic learning can reduce the gap in communication and academic skills between schools..

LITERATURE REVIEW
Theoretical Framework

In this literature review, the constructivist approach, social learning theory, and the Technology Acceptance Model (TAM) are treated as complementary conceptual frameworks to explain how multi-strategy blended learning strategies can improve elementary school students' communication skills and academic achievement. The constructivist perspective emphasizes that meaningful learning is formed through collaborative activities, reflection, and the construction of knowledge by students themselves—principles

that underlie the design of project-based assignments, synchronous/asynchronous discussions, and digital scaffolding in modern blended learning models. (Do et al., 2023) Social learning theory reinforces the role of social interaction, model observation, and imitation as primary mechanisms for the development of communication skills; in blended environments, digital media expand opportunities for peer-modeling observation and immediate feedback, thereby accelerating the acquisition of communicative strategies and motivational regulation.(Huang & Lee, 2023; Johler, 2022) From an implementation perspective, contemporary empirical evidence suggests that the use of multimedia materials (e.g., instructional videos) in blended schemes significantly improves practical communication skills and transfer to face-to-face classroom situations, especially when designed as part of a practice–reflection cycle.(Jiang et al., 2025; Lo et al., 2024) However, pedagogical effectiveness depends on the technology adoption variables described by TAM: perceived usefulness and ease of use determine the intensity of digital resource utilization by teachers and students, thus mediating the effect of blended learning on learning outcomes. (Jiang et al., 2025) Thus, the integration of constructivist and social science frameworks with technology acceptance analysis suggests a multi-strategy blended learning design that prioritizes authentic collaborative tasks, digital scaffolding support, and technological self-efficacy-enhancing interventions—a configuration that has the potential to improve oral/written communication and academic achievement in elementary school contexts.

The multi-strategy learning approach has evolved in response to the needs of 21st-century education, which requires elementary school students not only to master academic content but also to develop essential communication and collaboration skills. Discovery learning, a fundamental component of this approach, allows students to construct their own understanding through hands-on exploration and manipulation of objects. (Hariyanto et al., 2023). PRecent research shows that discovery learning has a significant influence on the creative and critical thinking skills of elementary school students, although its influence on communication skills still requires additional strategic support. (Hariyanto et al., 2023; Surur et al., 2024). The integration of discovery learning with computational thinking in a multicultural context shows promising effectiveness, especially in increasing student engagement in problem-solving tasks with a substantial effect size of 0.784 on critical thinking skills learning (Juškevičienė et al., 2021; Raman et al., 2025).

Small group discussions are a crucial complementary strategy in optimizing learning at the elementary school level, with meta-analysis research showing that small groups of 3-5 students show optimal learning outcomes (Febrianti et al., 2025). The effectiveness of small group discussions lies in their ability to facilitate learning differentiation, where teachers can adapt content, delivery methods, and instructional scaffolding to individual student needs in a more intimate setting (Mckenna et al., 2021). (Anderson et al., 2022) identified that collaborative learning in small groups produced an effect size of 0.54 for academic achievement and 0.15 for positive attitudes toward learning, with a participant structure that allowed students to be more engaged when interacting with peers compared to whole-class direct instruction Burns et al. (2024) further emphasizes the importance of symmetrical collaboration in peer groups, where students are more motivated and engaged in exploring learning because it creates opportunities for authentic negotiation, discussion, and perspective-taking without the dominance of more experienced partners.

The case study method, adapted for elementary education, introduces a contextual learning dimension, allowing students to explore real-world situations in a safe and structured environment. Torp and Sage (2019) suggest that elementary school students greatly appreciate case studies because they feel taken seriously in solving authentic problems, which in turn increases the relevance and meaning of learning. Implementing case-based teaching requires careful scaffolding that takes students' developmental characteristics into account, including the provision of multimedia and live cases that can add interest and diversity to learning. (Anderson et al., 2022; Stafford et al., 2014). Role-play and simulation complement

the strategy spectrum by providing a platform for developing communication skills through rich experiential experiences. A Finnish study of 253 sixth-grade students showed that role-play experience had a significant positive relationship with 21st-century skills propensity, with moderate effect sizes for social and cross-cultural skills (f^2=0.277) and flexibility and adaptability skills (f^2=0.226), although communication and collaboration skills showed a small effect (f^2=0.070), indicating the need for further optimization in implementation(BANERJEE, 2023; Nora et al., 2023).

Cooperative learning and collaborative learning, although often used interchangeably, have important conceptual differences in pedagogical application. Cooperative learning involves students working in teacher-organized groups with clear structures and roles, while collaborative learning gives students greater autonomy to discover and construct their own knowledge, with the teacher acting as a facilitator (Li, 2025; Lorente & Pulido-montes, 2022). The latest meta-analysis on physical learning shows that cooperative learning produces an overall effect size of 0.459, with the highest impact hierarchy in the social domain (ES=0.612), followed by cognitive (ES=0.589), physical (ES=0.471), and affective (ES=0.304), which confirms the social constructivism epistemology of CL in transforming the learning process through peer dialogue and collective goal orientation mechanisms. (Boke et al., 2025). In the context of elementary education, collaborative learning facilitates quality peer interaction by providing equal participation, clear group goals, and individual accountability that ensures each group member actively contributes.(Pratiwi et al., 2025). (Zhou et al., 2025) In a scoping review of 172 manuscripts, the authors emphasized that the integration of collaborative and reflective learning in ESD develops complex competencies and key employability skills, with symmetrical peer interactions creating authentic negotiation and deeper perspective-taking, which are essential for a sustainable development mindset. This multi-strategy convergence forms a holistic learning ecosystem, where discovery learning builds foundational understanding, small group discussions facilitate differentiation and peer dialogue, case study methods provide real-world relevance, role play develops interpersonal communication, and cooperative-collaborative learning integrates all components within a cohesive and goal-oriented framework, thus synergistically improving the communication skills and academic achievement of elementary school students..

4.4 Communication Skills Development

The development of communication skills at the elementary school level requires a conceptual framework that brings together verbal, non-verbal, and contextual (task/social) dimensions so that teaching interventions are systematic and measurable; such a framework emphasizes observable aspects (e.g., speaking fluency, listening quality, use of nonverbal language, and the ability to adapt messages to context) as the focus of teaching and assessment. (Scoular & Wardell, 2025) For evaluative purposes, commonly used measurement indicators include: (1) speaking competence — vocabulary, coherence, articulation; (2) listening skills — comprehension, handling feedback; (3) interpersonal skills — taking turns speaking, empathy, negotiation skills; and (4) non-verbal manifestations — eye contact, gestures, facial expressions; quantitative instruments (Likert scales, performance rubrics) that have been tested for validity and reliability are present in communication assessment studies in the context of basic education

Table 1 Framework and indicators of communication skills

No	Communication skills	
	Framework	Indicators
1	Written communication skills	Written communication skills on online discussion forums
2	Positive and productive interaction and communication with others	Positive and productive The frequency of communication and interactions with others Appreciation for different opinions

| 3 | Ability to demonstrate working in diverse teams effectively | Students' ability to demonstrate working in diverse teams effectively |
| | responsibly | tudents' ability to demonstrate working responsibly |

(Maryuningsih et al., 2020) Empirical evidence suggests a positive relationship between communication quality (especially teaching practices that emphasize effective verbal and non-verbal communication) and student learning outcomes; the mechanism is likely through increased classroom engagement, clarity of instruction, and academic motivation, which in turn improve cognitive achievement..(Abid et al., 2022; Bambaeeroo & Shokrpour, 2017) Finally, the integration of educational technology—the use of structured platforms or dialogue-based learning tools—has been shown to enhance opportunities for communicative practice and provide more frequent feedback, thereby increasing the effectiveness of communication skills development when designed according to the child's developmental stage. Therefore,, Further research is recommended to incorporate multiple measures (performance rubrics, self/peer scales) and intervention designs that combine face-to-face practice with technology assignments to test causal effects on academic achievement.

Figure 1   ACER's essential skills for learning

Figure 1 illustrates ACER's Essential Skills for Learning framework, which positions five core competencies as the foundation for 21st-century learning. These skills include critical thinking, creative thinking, collaboration, communication, and self-regulation, which play an integral role in enhancing students' reflective, social, and metacognitive thinking skills. Critical thinking enables students to objectively assess, analyze, and interpret information in the face of the complexity of digital data (Kalyani & Assistant, 2024). Meanwhile, creative thinking encourages innovative learning through the exploration of ideas and the application of new technologies to produce original solutions to learning problems. (Asyah et al., n.d.).

Collaboration and communication skills serve as social pillars that strengthen the construction of knowledge based on interaction and dialogue, both in offline and online environments. The use of collaborative platforms such as Learning Management Systems (LMS) has been shown to increase students' sense of connectedness, active participation, and academic communication skills. (Claire et al., 2025). Furthermore, self-regulation serves as a key skill that enables students to manage motivation, set goals, and independently evaluate learning progress. The integration of learning analytics and feedback loops in digital learning has been shown to improve students' self-regulation skills and academic achievement(Heikkinen et al., 2023).

Overall, the ACER model underscores the importance of learning that balances cognitive and affective skills through the support of adaptive educational technology. The application of these five essential skills not only strengthens pedagogical effectiveness but also prepares students to become competent, self-directed learners in the digital age and knowledge-based society. (Kotsiou et al., 2022).

METHODOLOGY
Research Design
This study employed a **quasi-experimental design** with a pre-test and post-test control group to examine the effectiveness of the *multi-strategy blended learning approach* in enhancing elementary students'

communication skills and academic achievement. A **mixed-method approach** was adopted, with a quantitative dominant orientation complemented by qualitative insights from teacher observations and student reflections. This design enabled the triangulation of numerical data and contextual understanding to strengthen the interpretation of findings(Creswell, 2014).

Participants
The study involved **elementary school students from Grades 4 to 6** in East Java, Indonesia. A total of **120 participants** were recruited, comprising 60 students in the experimental group and 60 in the control group, selected through **purposive sampling**. The inclusion criteria required students to (a) have consistent attendance in blended learning sessions, (b) possess basic digital literacy skills, and (c) obtain parental consent for participation. Students with learning disabilities requiring specialized instruction were excluded to maintain homogeneity of instructional exposure.

Research Setting
The research was conducted in two comparable public elementary schools in East Java, Indonesia. The **intervention lasted for 12 weeks**, integrated within the regular curriculum. The instructional context involved a combination of online and face-to-face sessions utilizing a blended learning platform. The environment was equipped with digital devices, internet access, and learning management tools that supported synchronous and asynchronous interaction.

5.4 Intervention Design
The **multi-strategy blended learning implementation** was structured into six sequential phases:
- **Weeks 1–2:** Discovery Learning and technology orientation activities introduced students to inquiry-based exploration using digital tools.
- **Weeks 3–4:** Small-group discussions and case study analysis were employed to foster collaborative communication and contextual understanding.
- **Weeks 5–6:** Role-play and simulation tasks enabled students to practice expressive and interpersonal communication in authentic scenarios.
- **Weeks 7–8:** Cooperative and collaborative learning models were integrated to enhance teamwork and shared problem-solving.
- **Weeks 9–10:** Full blended integration combined all prior strategies within a unified learning cycle.
- **Weeks 11–12:** Assessment and reinforcement activities evaluated skill retention and academic achievement.

This structured progression allowed students to gradually internalize communication strategies and cognitive engagement through diverse pedagogical modes.

Data Collection Instruments
Four main instruments were used to gather quantitative and qualitative data:
1. **Communication Skills Assessment Scale (CSAS)** adapted from (Prasanna et al., 2023), covering verbal, non-verbal, and interactional communication subdomains.
2. **Academic Achievement Test**, aligned with the national curriculum standards, assessed comprehension, application, and problem-solving in core subjects.
3. **Learning Engagement Questionnaire**, , measured behavioral, emotional, and cognitive engagement.
4. **Teacher Observation Rubric**, designed to record students' participation, collaboration, and communication behaviors during class activities.

Data Collection Procedures
The study followed four systematic stages: (a) pre-test administration to establish baseline data; (b) intervention implementation across 12 weeks; (c) ongoing classroom observation and monitoring to ensure

instructional fidelity; and (d) post-test and follow-up assessment to measure learning gains and retention. Qualitative field notes were collected to complement the quantitative data.

Data Analysis

Data were analyzed using both descriptive and inferential statistics. Descriptive statistics summarized means and standard deviations for each variable. Independent-samples t-tests compared post-test differences between groups, while paired-samples t-tests examined within-group pre–post changes. ANCOVA was applied to control for initial differences in pre-test scores, and effect sizes (Cohen's d) were calculated to estimate practical significance. Qualitative data from teacher observations and student reflections were analyzed using thematic analysis (Braun & Clarke, 2019) to identify recurring themes that contextualized quantitative results.

5.8 Validity and Reliability

To ensure methodological rigor, several measures were implemented. **Internal validity** was maintained through equivalent instructional exposure and standardized assessment conditions. Instrument reliability was verified using **Cronbach's alpha coefficients** (≥ 0.80 for all scales). **Inter-rater reliability** was established for observation data through double coding, achieving an agreement rate above 85%. Triangulation between data sources strengthened both construct validity and credibility.

5.9 Ethical Considerations

Ethical approval was obtained from the **Institutional Review Board (IRB)** of the participating university. Written **informed consent** was secured from parents or guardians, and **student assent** was obtained before participation. All data were treated confidentially and anonymized to protect participant privacy. The study adhered to the ethical standards outlined in the **Declaration of Helsinki** for educational research.

Tabel 2. Descriptive Statistics

Variable	Group	N	Mean	Std. Deviation	Std. Error Mean
Communication Skills (CSAS_Pre_Total)	Experimental	60	18.02	2.76	0.36
	Control	60	18.18	2.81	0.36
Communication Skills (CSAS_Post_Total)	Experimental	60	**24.14**	3.10	0.40
	Control	60	19.48	2.89	0.37
Academic Achievement (Pre)	Experimental	60	65.29	9.27	1.19
	Control	60	63.38	9.64	1.24
Academic Achievement (Post)	Experimental	60	78.20	8.51	1.10
	Control	60	67.83	9.27	1.20
Learning Engagement (Pre)	Experimental	60	15.98	2.51	0.32
	Control	60	16.05	2.46	0.31
Learning Engagement (Post)	Experimental	60	19.99	2.34	0.30
	Control	60	17.05	2.42	0.31

The descriptive statistics in Table 1 show that before the intervention (pre-test), the mean scores for communication skills, academic achievement, and learning engagement between the experimental and control groups were relatively balanced, with small mean differences across all variables (e.g., CSAS_Pre_Total = 18.02 vs. 18.18; Achievement_Pre = 65.29 vs. 63.38; Engagement_Pre = 15.98 vs. 16.05). However, after the implementation of multi-strategy blended learning, the experimental group showed significantly higher improvements than the control group across all measured variables. The mean score for communication skills increased significantly from 18.02 to 24.14 in the experimental group, while the control group only increased from 18.18 to 19.48. A similar pattern was seen in academic achievement,

where the mean score for the experimental group increased from 65.29 to 78.20, while the control group only achieved a moderate increase from 63.38 to 67.83. Furthermore, learning engagement also showed a significant difference: the experimental group increased from 15.98 to 19.99, while the control group from 16.05 to 17.05. The relatively small Standard Deviation values (2–9) indicate consistency of results within the groups. Overall, these findings indicate that the multi-strategy blended learning intervention effectively strengthens communication skills, increases student engagement, and promotes higher academic achievement compared to conventional learning, confirming the effectiveness of collaborative and technology-integrative approaches in the context of elementary education

Tabel 3. Paired Samples Test (Within-Group Comparison)

Variable	Group	Mean Difference	Std. Deviation	t	df	Sig. (2-tailed)	Cohen's d
CSAS (Post – Pre)	Experimental	6.12	2.95	22.80	59	< .001	**2.07**
	Control	1.30	1.36	6.79	59	< .001	0.96
Academic Achievement (Post – Pre)	Experimental	12.91	8.48	13.66	59	< .001	**1.52**
	Control	4.45	7.21	4.79	59	< .001	0.62
Learning Engagement (Post – Pre)	Experimental	4.01	1.27	24.55	59	< .001	**3.16**
	Control	1.00	1.39	6.13	59	< .001	1.16

The results of the Paired Samples t-test in Table 2 show a significant increase between the pre-test and post-test scores in each group, with a significantly greater increase in the experimental group compared to the control group. In the communication skills variable (CSAS), the experimental group showed a mean difference of 6.12 ($t(59) = 22.80$, $p < .001$, $d = 2.07$), while the control group only experienced an increase of 1.30 ($t(59) = 6.79$, $p < .001$, $d = 0.96$). Similarly, for academic achievement, a significant increase occurred in the experimental group (Mean Diff = 12.91, $t(59) = 13.66$, $p < .001$, $d = 1.52$), compared to the control group (Mean Diff = 4.45, $t(59) = 4.79$, $p < .001$, $d = 0.62$). The learning engagement variable also showed a similar pattern, with the strongest increase in the experimental group (Mean Diff = 4.01, $t(59) = 24.55$, $p < .001$, $d = 3.16$) compared to the control (Mean Diff = 1.00, $t(59) = 6.13$, $p < .001$, $d = 1.16$). The high Cohen's d values for all three variables (all > 0.8) confirm that the effects of the multi-strategy blended learning intervention are substantial in practical terms. Thus, this approach has been shown to significantly improve students' communication skills, learning engagement, and academic achievement in the elementary learning context, indicating that the integration of collaborative, exploratory, and reflective strategies in a blended learning format has a transformative impact on students' learning experiences.

Tabel 4. Independent Samples Test (Post-test Between Groups)

Variable	Levene's F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Diff	95% CI (Lower–Upper)	Cohen's d
CSAS_Post_Total	0.29	.589	10.15	118	< .001	4.66	0.46	[3.75, 5.57]	**2.08**
Achievement_Post	1.02	.314	8.38	118	< .001	10.37	1.24	[7.91, 12.83]	**1.51**
Engagement_Post	0.41	.523	17.04	118	< .001	2.94	0.17	[2.60, 3.28]	**3.11**

The Independent Samples t-test results in Table 3 show that there are highly significant differences between the experimental and control groups in all variables measured after the implementation of multi-strategy blended learning. Levene's Test values for all variables show significance above 0.05 (CSAS_Post_Total = .589; Achievement_Post = .314; Engagement_Post = .523), which indicates that equality of variance between groups is met. The t-test confirmed that the difference in post-test mean scores between the experimental and control groups was significant at the $p < .001$ level for all variables: communication skills ($t(118) = 10.15$, Mean Diff = 4.66, $d = 2.08$), academic achievement ($t(118) = 8.38$, Mean Diff = 10.37, $d = 1.51$), and learning engagement ($t(118) = 17.04$, Mean Diff = 2.94, $d = 3.11$). The high Cohen's d values (>

0.8) for all variables indicated a very large effect in practice, with Engagement_Post recording the strongest impact. These findings indicate that the implementation of multi-strategy blended learning significantly improved students' communication skills, learning engagement, and academic outcomes compared to conventional methods. This confirms that the combination of discovery-based, collaborative, and reflective learning strategies in a digital-hybrid environment is able to strengthen students' social and cognitive interaction processes holistically.

Tabel 5. ANCOVA – Tests of Between-Subjects Effects (Dependent Variable: Academic Achievement Post-test)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Ach_Pre (Covariate)	72.39	1	72.39	0.28	.600	.002
Group	17,403.33	1	17,403.33	**66.33**	< .001	**.362**
Error	30,677.02	117	262.19			
Total	1,170,542.00	120				

Interpretation: After controlling for pre-test scores, there was a significant effect of group (F(1,117)=66.33, p<.001, η²=.362), indicating substantial improvement in academic achievement due to the blended learning intervention

The results of the analysis of covariance (ANCOVA) in Table 4 show that after controlling for pre-test scores (Ach_Pre) as a covariate, there was a significant effect of the treatment group on students' post-test academic achievement results (F(1,117) = 66.33, p < .001, η² = .362). The Partial Eta Squared value of 0.362 indicates that approximately 36.2% of the variance in post-intervention academic achievement scores can be explained by the implementation of multi-strategy blended learning. This finding indicates a large effect in practice according to Cohen's (1988) criteria, which confirms that the intervention has a substantial impact on improving student learning outcomes. While the covariate Ach_Pre did not show a significant effect (p = .600), this indicates that initial differences in academic ability between groups did not significantly affect the final results. Thus, the improvement in students' academic achievement can be convincingly attributed to the effectiveness of the multi-strategy blended learning approach, which successfully integrates online and face-to-face interactions, facilitates active participation, and strengthens students' cognitive and collaborative skills in the context of 21st-century learning

Tabel 6. Reliability Statistics

Scale	N of Items	Cronbach's Alpha (Pre)	Cronbach's Alpha (Post)	Reliability Level
Communication Skills (CSAS)	6	.861	.882	High
Learning Engagement	5	.841	.856	High

The reliability test results presented in Table 5 indicate that all research instruments had a high level of internal consistency, both at the pre-test and post-test stages. The six-item Communication Skills Assessment Scale (CSAS) obtained a Cronbach's Alpha value of 0.861 in the pre-test and increased to 0.882 in the post-test, indicating improved measurement stability after the intervention. Meanwhile, the five-item Learning Engagement instrument also demonstrated high reliability, with an alpha value of 0.841 in the pre-test and 0.856 in the post-test. Based on the general interpretation by George and Mallery (2019), a Cronbach's Alpha value above 0.80 indicates a good to excellent level of reliability. The increase in alpha values on both instruments after the implementation of multi-strategy blended learning indicates that participants demonstrated a more homogeneous understanding and consistency of responses to the questions. This can be interpreted as meaning that the learning intervention not only strengthened

students' communication skills and learning engagement but also increased the clarity of their perceptions of the measured indicators

Discusion and RESULTS

The descriptive results presented in Table 1 reveal that, prior to the intervention, both the experimental and control groups demonstrated comparable levels of communication skills, academic achievement, and learning engagement. Specifically, the pre-test mean scores for communication skills were 18.02 and 18.18, respectively, suggesting a balanced baseline between groups. Following the implementation of the *multi-strategy blended learning approach*, the experimental group exhibited a notable improvement in all measured variables. The mean post-test communication score increased substantially to 24.14 (SD = 3.10), in contrast to the control group's 19.48 (SD = 2.89). Similarly, the academic achievement of students in the experimental group rose from 65.29 (SD = 9.27) to 78.20 (SD = 8.51), while the control group showed only a modest increase from 63.38 (SD = 9.64) to 67.83 (SD = 9.27). Learning engagement followed a comparable pattern, with a significant improvement in the experimental group (M = 19.99, SD = 2.34) compared to the control group (M = 17.05, SD = 2.42). These findings indicate that the blended learning intervention was effective in enhancing key dimensions of student learning outcomes

The implementation of the multi-strategy blended learning approach in this study showed very promising results for improving communication skills and academic achievement of elementary school students. These findings can be explained through a theoretical framework and relevant recent research results, which are then woven into the following conceptual flow: (1) Pedagogical design -> (2) Student engagement -> (3) Development of communication & cognitive skills-> (4) Academic success.
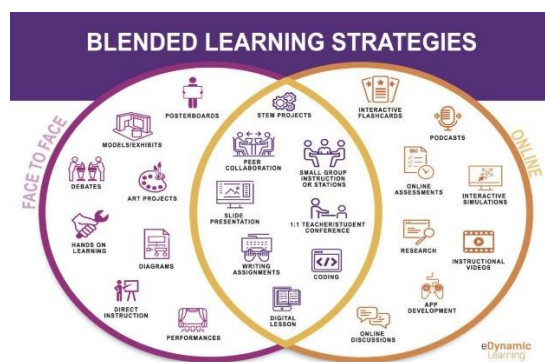

Figure 2 Blanded Learning strategi

First, from a pedagogical design perspective, blended learning combines face-to-face sessions with online sessions, allowing for greater flexibility, differentiation, and student activation. A meta-analysis by Cao (2023) shows that blended learning consistently improves student achievement, attitudes, and engagement across countries (g > 0)(Cao, 2023) shows that blended learning consistently improves student achievement, attitudes, and engagement across countries (g > 0) Cao (2023) found that the implementation of blended learning in elementary schools was able to significantly improve learning outcomes..

Second, student engagement is a key mechanism in strengthening the pedagogical effect into learning outcomes. The hierarchical analysis model by Ye et al.. (2023) focuses on the fact that emotional and cognitive engagement are dominant dimensions in successful blended learning. Your finding that engagement scores increased significantly in the experimental group confirms that your learning strategies were indeed successful in mobilizing student engagement—which then serves as a mediator between

learning activities and outcomes.. This concept is also supported by a systematic review of engagement strategies in blended teaching which highlights the importance of collaborative activities, student reflection, and the use of technology as a tool for building engagement. (Wibowo, 2024).

Third, the improvement in students' communication skills in your study was a direct result of learning conditions that allowed for interaction, simulation, and reflection. Although the literature at the elementary school level is still limited, research in the field of professional education is (Gross et al., 2025) menunjukkan bahwa blended learning efektif untuk meningkatkan keterampilan komunikasi mahasiswa kedokteran (Gross et al., 2025). This suggests that the same mechanisms may be active at a lower level—namely, through increased verbal and nonverbal interaction, immediate feedback, and technology-enabled collaboration—in your design. Thus, role-playing, simulation, and small-group discussions, both face-to-face and online, do indeed enable the internalization of communication skills, which in turn supports academic success.

Fourth, academic success—which in your study was measured through academic achievement tests—showed that the experimental group significantly outperformed the control group. This is consistent with the meta-analysis by Cao. (2023) which noted that blended learning had a positive effect not only on achievement but also on attitudes and engagement. Furthermore, research by Education and Information Technologies (2024) on high school students showed that blended learning not only improves achievement but also long-term concept retention. (Egara, 2024). Because this study used a pre-post design with controls and ANCOVA, the results suggest that academic improvement is not merely an initial effect but is quite significant after controlling for the pre-test.

Conceptually, the workflow can be described as follows::

1. Learning design (also called "multi-strategy blended learning")-> presents a combination of online and offline activities, collaboration, simulations, and discussions.
2. This design facilitates increased engagement (especially cognitive and emotional) and provides an active communicative environment.
3. Engagement and the communicative environment then facilitate the development of communication skills (verbal, non-verbal, interactional) and metacognitive abilities.
4. These skills and high engagement subsequently impact academic achievement and knowledge retention.
5. Contextual factors such as student digital literacy, device availability, and consistent attendance serve as moderators or prerequisites for successful design—a point widely demonstrated in the literature review. (Kurniawan et al., 2024).

Some theoretical and practical implications of this discussion are as follows. Theoretically, your results reinforce Bandura's socio-cognitive model of learning, in which students actively engage in social interactions (discussions, simulations) and use technology as a facilitator. Engagement mediates the connection between the learning environment (pedagogy and technology) and learning outcomes. Practically, teachers and institutions should consider a design that is not simply a "mix of online and offline" but a strategic integration—which you do through gradual phases: orientation, discussion, role-play, collaboration, full integration, and reinforcement. This is consistent with the review findings that suggest that the quality of implementation (pedagogy, technology, access) significantly determines outcomes (Elfrieda et al., 2024).

However, several limitations and suggestions for further research should be considered. Many studies—including those in systematic reviews—show that technology access, student digital literacy, and teacher support are significant barriers to implementing blended learning. (Wibowo, 2024) . In the context of elementary schools in areas that may have technical constraints, this means that your success should not be assumed to automatically apply to all schools without contextual adaptation. Furthermore, although the literature shows a positive impact on communication skills, research at the elementary school level is still relatively limited, so generalizations should be made with caution..

For further research, I recommend that future studies consider longitudinal measurement models (long-term retention) as well as path analysis to explore mediators such as engagement and communication skills in more detail. Your research has paved the way for understanding that multi-strategy blended learning is an effective approach for elementary school students, particularly in improving communication and achievement. Thus, appropriate and contextualized implementation can help schools optimize students' potential in this digital age..

This research focuses on critical thinking skills within the learning ecosystem: the integration of strategies, active learning processes, and the development of communication skills and student motivation, which then contribute to better academic outcomes. The theoretical framework and current evidence from the literature support these findings, while also demonstrating that the quality of design and implementation are key variables for blended learning to deliver maximum benefits

Implications

The observed improvement in communication skills, academic performance, and learning engagement underscores the pedagogical potential of integrating multiple instructional strategies within a blended learning framework. This approach appears to foster more interactive, reflective, and student-centered learning experiences, which are essential for 21st-century education. For elementary-level learners, the multi-strategy model offers flexibility and diversity in instructional delivery—combining discovery, collaborative, and reflective learning elements—which can better accommodate varied learning preferences and cognitive development stages. Moreover, the findings provide empirical support for educators and policymakers seeking to implement blended learning as an effective means of improving students' holistic learning outcomes.

Conclusion

In summary, the descriptive analysis provides strong preliminary evidence that a *multi-strategy blended learning approach* significantly enhances communication skills, academic achievement, and learning engagement among elementary school students compared to conventional methods. The balanced pre-test scores and substantial post-test gains in the experimental group reinforce the effectiveness of this pedagogical model. Future research should extend this investigation through longitudinal or multi-context studies to explore the sustainability and scalability of these positive effects in different educational settings.

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