

Teachers' Perspectives On Developing Collaborative Skills In Indonesian Elementary Students: A Qualitative Study

Dadan Setiawan^{1*}, Bunyamin Maftuh², Ernawulan Syaodih³, Arie Rakhmat Riyadi⁴

^{1,2,3,4} Elementary Education, Faculty of Education, Indonesian University of Education, Bandung, Indonesia

* dadansetiawan03@upi.edu

Abstract. This study explores elementary students' collaborative skills from both student and teacher perspectives, with a focus on group interaction dynamics and pedagogical strategies that promote effective collaboration. The qualitative study was conducted in four elementary schools in Cirebon Regency, involving 24 students and four teachers. Data were collected through classroom observations, semi-structured interviews, and learning document analysis. Findings indicate that students perceive collaboration as task-sharing, mutual support, and joint decision-making in classroom projects. Key challenges include differences in abilities, individual dominance, and uneven group coordination. Teachers emphasized the importance of strategic planning, facilitation of interactions, establishment of group norms, and continuous feedback to optimize collaboration. The results highlight that collaborative skills develop through active pedagogy, consistent teacher monitoring, and the habituation of collaborative practices in daily learning activities. This study provides significant insights for designing systematic and measurable learning strategies aimed at enhancing elementary students' collaborative competencies, offering practical implications for teachers and educational policymakers.

Keywords: Collaborative Skills, Elementary Students, Teacher Perspective, Active Pedagogy.

INTRODUCTION

The development of global society, marked by the acceleration of digital technology, cross-cultural connectivity, and changes in the nature of the workplace, requires education systems to prepare students with adaptive and collaborative 21st-century competencies (Osiesi & Bignaut, 2025). In this context, collaborative skills are one of the key abilities that must be developed from elementary school. These skills encompass not only the ability to work together effectively but also empathetic communication, social responsibility, and the ability to make joint decisions in complex situations (Liu et al., 2025; Trilling & Fadel, 2009; Varas et al., 2023). The OECD, through its Learning Compass 2030, emphasizes that collaboration is a transformative competency that contributes directly to individual and social well-being in the future (OECD, 2018).

Globally, the results of the 2018 Programme for International Student Assessment (PISA) survey indicate that students' collaborative skills in many countries still need to be strengthened. In the Collaborative Problem Solving assessment (OECD, 2017), only around 8% of students were able to work together effectively to solve complex problems. Indonesia, as one of the participating countries, recorded an average score that was still below the OECD average, indicating the need to improve social and collaborative competencies starting in elementary school (OECD, 2023). This condition is reinforced by a UNESCO report (2022)

which emphasized the gap between mastery of cognitive literacy and social-emotional learning in many developing countries, including Indonesia (UNESCO, 2022).

In the national context, the government, through the Independent Curriculum and the Pancasila Student Profile policy, has placed the values of mutual cooperation, empathy, and collaboration as key pillars of student character development (Kemendikbudristek, 2023). However, various studies indicate that developing collaborative skills in Indonesian elementary schools still faces substantial challenges. Studies by Kusumaningsih & Sun (2025) and Ayu et al., (2015) found that learning in many elementary schools remains teacher-oriented, individualistic, and does not provide sufficient space for students to engage in authentic collaborative activities. Furthermore, most teachers admit to lacking a deep understanding of the concept of collaboration and effective pedagogical strategies for fostering it in heterogeneous classroom contexts (Anggraini et al., 2024; Sambella et al., 2025). Data from the Center for Education Assessment also shows that only 32% of elementary school teachers consistently implement collaboration-based learning activities in the classroom (Kemendikbudristek, 2023).

This gap indicates that although national policies have emphasized the importance of collaboration, practice on the ground remains far from ideal. While previous research has focused on developing collaborative learning models or student learning outcomes, few studies have in-depth explored elementary school teachers' perspectives on how collaborative skills are developed, understood, and implemented in everyday learning. Yet, teachers play a key role in translating curriculum policies into concrete practices and shaping a collaborative culture in the classroom (Retno et al., 2025).

Based on this background, this study aims to answer the main question: What are the perspectives of elementary school teachers in Indonesia on the development of students' collaborative skills? This question is broken down into three focuses: (1) how teachers understand the concept of collaborative skills; (2) what pedagogical strategies they use to foster collaboration in the classroom; and (3) what challenges they face in implementing them. This study has novelty value in highlighting the epistemological and practical dimensions of teachers' experiences, not just student learning outcomes. With a qualitative approach, this study is expected to provide empirical and conceptual contributions to efforts to improve the quality of collaborative learning in Indonesian elementary schools, while also enriching the global literature on the development of social-emotional competencies in the context of elementary education in developing countries.

METHODOLOGY

Design

This study used a qualitative approach with a phenomenological study design, aimed at understanding elementary school teachers' perspectives on developing students' collaborative skills. This approach was chosen because it allows for exploring teachers' subjective meanings and authentic experiences in implementing collaborative practices in the classroom (Creswell & Creswell, 2018). The primary focus of this study is how teachers interpret collaboration, the pedagogical strategies they use, and the challenges they face in developing these skills among elementary school students.

Research Participants

The study was conducted in four public elementary schools in Cirebon Regency, West Java, Indonesia. Site selection was conducted purposively, taking into account varying school characteristics, including accreditation status, geographic location (urban and semi-urban), and implementation of the Independent Curriculum. Participants included four classroom teachers (one from each school) and 24 fourth-grade students, selected through purposive sampling. The teachers involved had at least five years of teaching experience and actively implemented collaborative-based learning. Student participation focused on learning groups, which were part of classroom observations.

Data Collection

Data in this study were collected through three main techniques: classroom observation, semi-structured interviews, and learning document analysis. Observations were conducted during eight collaborative learning sessions to record the dynamics of student interactions, communication patterns, teacher roles, and facilitation strategies used. The results were systematically recorded through observation sheets and field notes. Semi-structured interviews were conducted with four teachers and 24 purposively selected students to explore their understanding of collaboration, learning experiences, strategies implemented, and challenges encountered; all interviews were audio-recorded and transcribed verbatim for thematic analysis. Document analysis included Lesson Plans, group worksheets, and student project results to explore concrete evidence of collaborative strategy implementation and teacher feedback. Triangulation was conducted between the three data sources to ensure the credibility of the findings. The entire data collection process took place over three months,

from August to October 2025, with formal permission from the principal and ethical approval from all participants.

Data Analysis

Data were analyzed using thematic analysis techniques (Braun & Clarke, 2019), which consisted of six stages: (1) data familiarization through repeated reading of transcripts and field notes; (2) initial coding of meaning units; (3) identification of initial themes; (4) review and refinement of themes; (5) naming and defining themes; and (6) developing a thematic narrative. Analysis was conducted iteratively between observational data, interviews, and documents to gain a holistic understanding of teacher practices and perceptions. To ensure data validity, Lincoln, & Guba (1985) trustworthiness criteria were used, which include credibility, transferability, dependability, and confirmability. These four criteria were maintained through triangulation of sources and methods, audit trails, and the researcher's reflective engagement during the interpretation process. The research began with a preliminary study to map collaborative learning practices in schools. Primary data collection was then conducted through observations and interviews. The collected data were then transcribed verbatim, categorized, and analyzed in stages. To maintain data credibility, researchers conducted member checking with participants and peer debriefing with two elementary education experts who were not directly involved in the study.

RESULTS AND DISCUSSION

Data analysis from classroom observations, semi-structured interviews, and document analysis yielded three main themes that illustrate how elementary school teachers understand, implement, and address challenges in developing students' collaborative skills. These three themes include:

1. Conceptualization of collaboration as a social and moral process,
2. Pedagogical strategies for fostering collaboration in the classroom, and
3. Implementation challenges and the need for systemic support.

These findings are presented in Table 1 below.

Table 1. Main Themes and Subthemes of the Research

Main Theme	Subtheme	Description
1. Conceptualizing Collaboration as a Social and Moral Process	1.1 Collaboration as Complementary Joint Work	Teachers conceptualize collaboration as an activity of
	1.2 Collaboration as the mutual assistance, appreciation Value of Mutual Cooperation and responsibility within a group. Social Empathy	of differences, and shared moral
2. Pedagogical Strategies in Collaborative Learning	2.1 Project-Based Learning and Group Discussion	Teachers foster collaboration through project-based tasks,
	2.2 The Teacher's Role as an Interaction Facilitator	active facilitation, and reflective activities designed to reinforce students' sense of shared
	2.3 Strengthening Group Norms and Reflection	responsibility and social awareness.
3. Implementation Challenges and Support Needs	3.1 Individual Dominance Ability Gaps	The main barriers include unequal participation, lack of
	3.2 Limited Resources, Professional Training	Time, systemic support, and limited pedagogical capacity; teachers require professional development and institutional
	3.3 The Need for Institutional Policy Support	reinforcement to optimize and collaborative learning.

Conceptualizing Collaboration as a Social and Moral Process

Teachers interpret collaboration as a social learning process that fosters empathy, caring, and the ability to share responsibilities. They emphasize that collaboration is not simply about dividing tasks, but rather about the ongoing practice of moral and social values.

As one teacher explained:

“Children learn to collaborate not only to get their assignments done, but also to learn how to respect their peers, listen, and help those in need.” (G2, September 2025).

Another teacher added:

“I always emphasize that group work isn't about who can do it the fastest, but about who can get their teammates to contribute.” (G4, September 2025).

Observational analysis shows that students also understand collaboration as a form of mutual support. One student said:

“If my friend can't do it, I'll help explain it. We work together to get good results.” (S5, October 2025).

These findings demonstrate that teachers and students share relatively consistent perceptions of collaboration, specifically the integration of the cognitive dimension (sharing ideas) and the affective dimension (empathy and caring). This perspective aligns with Vygotsky & Cole (2018) view that social interaction is the primary vehicle for the development of children's thinking and social skills. Furthermore, the emerging meaning of mutual cooperation demonstrates local Indonesian cultural values as the moral foundation of collaborative learning, as also outlined in the Pancasila Student Profile (Wahyudin et al., 2024).

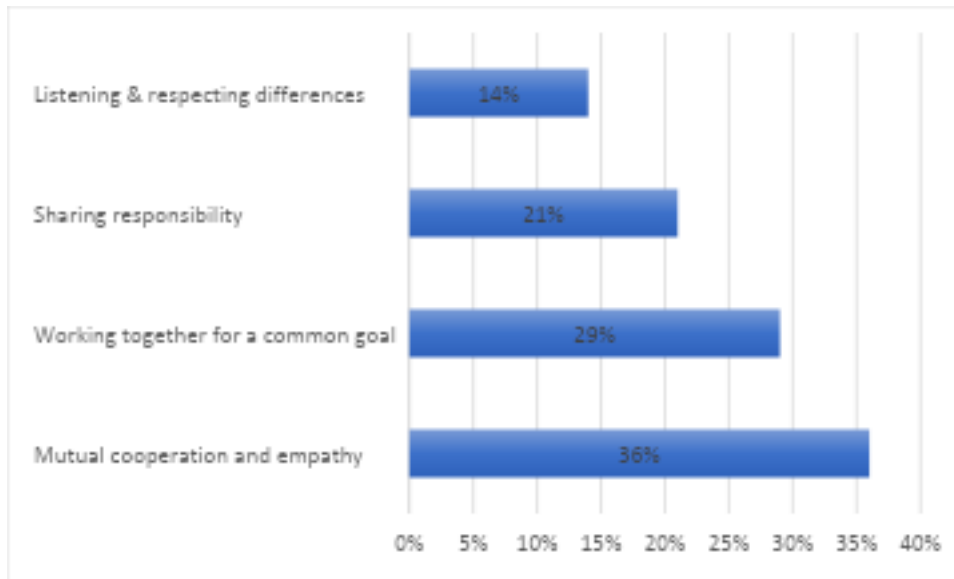


Figure 1. Distribution of Conceptual Codes on Teachers' Understanding of Collaboration

Figure 1 illustrates the results of a thematic analysis of 25 meaning units obtained from transcripts of in-depth interviews with elementary school teachers regarding their understanding of the concept of collaboration in a professional context. Each meaning unit was openly coded and then grouped into four main conceptual categories through axial coding and selective coding (Corbin, J., & Strauss, 2014).

The category with the highest frequency was “mutual cooperation and empathy” (36%), indicating that the majority of teachers viewed collaboration as a moral and social action based on local cultural values, namely the spirit of mutual assistance and caring for others. The category “working together for a common goal” (29%) confirmed that teachers understood collaboration as an effort to achieve collective effectiveness and outcomes, in line with the concept of collective efficacy (Yang et al., 2025). Meanwhile, “sharing responsibility” (21%) demonstrated an awareness of the importance of accountability and role-sharing in teamwork, while “listening and respecting differences” (14%) reflected the empathetic and dialogical dimensions of professional relationships (Schnepel et al., 2025).

The results of this study indicate that teacher collaboration is understood through two main dimensions: the moral-affective dimension and the professional-structural dimension. Collaboration is viewed not only as a work strategy but also as an ethical practice that fosters empathy, responsibility, and a shared awareness of educational goals. These findings

reinforce the view of moralized professionalism (Campbell, 2014), which posits that teacher professionalism is built on moral, humanitarian, and shared values.

Pedagogical Strategies for Developing Collaboration in the Classroom

Teachers use a variety of learning strategies that emphasize group activities and social reflection. The most frequently implemented strategies are project-based learning and guided group discussions, where students must plan, share roles, and complete tasks collectively.

An interview with teacher G1 explained:

"I usually give students environmental projects, for example, making a cleanliness poster. Each student has a part to play, but they have to discuss the results together. I monitor them so everyone is speaking." (G1, October 2025).

Observations indicate that teacher strategies emphasize not only the final product but also the process of interaction between students. The teacher acts as a facilitator, asking guiding questions such as *"Who is responsible for explaining the group's ideas?"* or *"How did you decide together?"*

In an interview with informant G3, a teacher stated:

"I try not to immediately provide solutions, but instead encourage discussion. Sometimes I ask them to evaluate their own group collaboration." (G3, October 2025)

From the students' perspective, they believe that good group work occurs when each member is active and listens to one another.

"I like it when teachers give group assignments, but sometimes some students don't want to talk. We're told to divide up the assignments so everyone can participate." (S2, September 2025).

Analysis of learning documents shows that even though collaborative activities are included in lesson plans, teachers' assessments still focus on the final product, rather than the interaction process or individual contributions within the group. This indicates a need to develop formative assessment instruments that systematically assess the collaborative dimension.

The findings of this study indicate that the pedagogical strategies implemented by teachers to foster collaboration in the classroom are oriented toward project-based learning and guided group discussions. These strategies emphasize social interaction, role-sharing, and shared reflection as the core of collaborative learning. The teacher's role as facilitator appears dominant, guiding students to engage in dialogue, express opinions, and conduct self-evaluations of group work dynamics. This aligns with Johnson, & Johnson (2013) view that the effectiveness of classroom collaboration depends on teachers' ability to build positive interaction structures that foster interdependence, individual accountability, and students' social skills.

Furthermore, observed learning practices indicate that teachers focus not only on the final project outcome but also on assessing the communication process among group members. This approach aligns with Lavasani et al. (2011), who emphasized the importance of teachers' role in facilitating reflective dialogue so that collaboration produces meaningful learning. However, analysis of learning documents indicates a gap between planning and implementation: teacher assessments still place greater emphasis on the final product than on the interaction process or individual contributions. This gap highlights the need to develop formative assessment instruments capable of holistically assessing collaborative dimensions, including communication, shared responsibility, and conflict resolution (Schnepel et al., 2025).

Thus, these findings reinforce the argument that effective collaborative pedagogical strategies require a balance between project-based activity design, reflective facilitation by teachers, and a formative assessment system that assesses students' social interaction processes. This integrative approach not only develops collaborative skills but also fosters social awareness and moral responsibility in the context of 21st-century learning (Trilling & Fadel, 2009).

Implementation Challenges and the Need for Systemic Support

Teachers encounter several obstacles in developing collaboration in the classroom. The most dominant challenges are differences in ability among students, individual dominance within groups, and limited learning time. An interview with Teacher G4 explained:

“The smart kids often dominate, while the others are quiet. So I have to keep going around reminding them to all play a role.” (G4, October 2025).

Teachers also highlighted the limited learning resources and limited time due to the busy curriculum.

“When class time is limited, sometimes group work doesn't get time to be discussed thoroughly. Reflection is actually important.” (G2, October 2025).

Furthermore, all four teachers emphasized the need for professional training related to collaborative learning strategies and assessment.

“We've never received specific training on how to assess collaboration. So we only assess group work.” (G1, October 2025).

The findings of this study revealed that teachers face a number of structural and pedagogical barriers to fostering collaboration in the classroom. Key barriers include disparities in ability among students, individual dominance within groups, limited learning time, and a lack of professional support for collaborative assessment. Teachers play an active role in managing group dynamics, but these efforts are often hampered by the need to maintain balanced participation among students of varying abilities. This situation reflects the challenges identified by Iraola et al. (2024) and Alharbi et al. (2018), namely that the effectiveness of collaborative learning depends heavily on managing social interactions and ensuring equitable participation mechanisms among group members.

In addition to internal classroom factors, limited time and resources also pose major barriers to meaningful group reflection. Teachers emphasized that the reflection process is often neglected due to curriculum pressures and administrative burdens. These findings align with research by Le et al. (2018), which shows that the success of collaboration in elementary school contexts is heavily influenced by time structure, organizational support, and curriculum flexibility.

Another significant barrier is the lack of professional training related to collaborative learning strategies and assessment. Teachers tend to assess group outcomes without considering the process dimension or individual contributions, indicating a gap in formative assessment competency (Hennessy, & Davies (2019). This situation reinforces Fullan (2016) argument that pedagogical change cannot rely solely on individual teacher initiative but requires systemic support from an institutional environment that provides resources, instructional leadership, and evaluation policies aligned with collaborative goals.

Thus, strengthening teacher professional capacity needs to be viewed as part of a systemic strategy to build a school ecosystem that supports sustainable collaboration. An integrated approach between institutional support, assessment policies, and ongoing professional

development is key to ensuring that collaborative learning does not stop at the conceptual level but is consistently realized in reflective and participatory classroom practices.

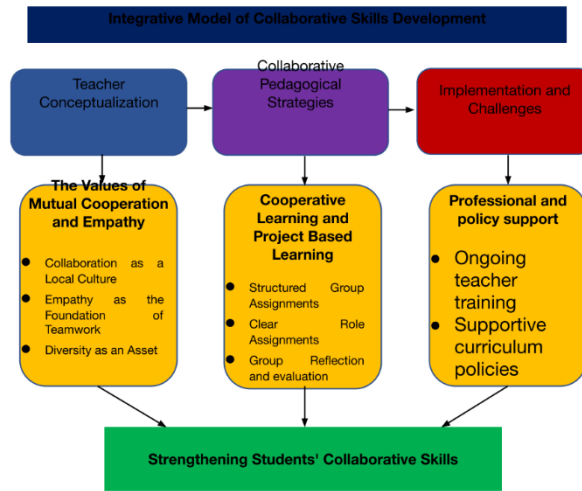


Figure 2. Integrative Model of Collaborative Skills Development

The integrative model in Figure 2 emphasizes that the development of elementary school students' collaborative skills cannot be understood as the result of a single factor, but rather as a systemic process involving the simultaneous interaction of conceptual, pedagogical, and institutional dimensions. Teachers who possess a moral and social understanding of collaboration are more likely to be able to design learning strategies that foster empathy, shared responsibility, and effective communication among students. However, the success of these strategies is highly dependent on structural support in the form of professional training, formative assessment policies, and a collaborative and reflective school culture.

Theoretically, this model expands the understanding of collaboration in the context of elementary education by positioning it as an eco-pedagogical practice one rooted in local cultural values but connected to 21st-century global competencies. This model aligns with Ungar et al., (2013) ecological approach to learning, which views children's social development as the result of multi-layered interactions between individuals, the classroom environment, and the broader education system. Thus, this integrative model offers a conceptual contribution to the global literature on collaborative education, while also providing a practical framework for developing learning strategies and education policies in Indonesia.

Practically, this model implies the need for a three-tiered approach to developing collaboration in elementary schools. First, at the micro level (classroom), teachers need to instill

collaborative values through project-based learning and social reflection. Second, at the meso level (school), principals and the teaching community need to create a collaborative climate and evaluation system that supports social-emotional learning. Third, at the macro level (policy), the government needs to strengthen professional training and collaborative assessment instruments so that collaborative practices do not stop at the discourse level but become a sustainable learning culture. Overall, the research findings indicate that elementary school teachers in Indonesia have a high conceptual awareness of the importance of collaboration as a 21st-century competency, but lack the pedagogical capacity and adequate assessment systems to develop it.

Overall, the research findings indicate that elementary school teachers in Indonesia have a high conceptual awareness of the importance of collaboration as a 21st-century competency, but lack the pedagogical capacity and adequate assessment systems to develop it.

These findings reinforce the view of Anggraini et al. (2024) and Mattessich, & Johnson (2018) that collaboration at the elementary level will only be effective if teachers are able to integrate social interaction, self-reflection, and group accountability into learning design. However, in the Indonesian context, collaboration has a distinct cultural meaning rooted in the values of mutual cooperation and social solidarity. These values can serve as leverage in designing collaborative learning based on local culture.

Furthermore, this research adds a novel contribution to the international literature by demonstrating that collaboration in elementary school students is not simply a social skill, but also a moral and cultural practice rooted in the local context. Thus, a pedagogical approach based on socio-cultural values can be an effective strategy in building sustainable collaborative competencies.

However, this study has several limitations that warrant attention. First, the scope of the study was limited to four elementary schools in Cirebon Regency, making the findings not generalizable to the entire Indonesian context. Further studies with broader coverage and diverse school characteristics are needed to enhance external validity. Second, the relatively short duration of the study (three months) did not allow researchers to capture the long-term dynamics of changes in teachers' pedagogical practices. Third, the study focused more on teachers' perspectives, while in-depth exploration of students' collaborative behavior was limited. Future research is recommended to use a mixed methods approach or longitudinal observation to capture a more comprehensive picture of collaborative processes in the classroom. Fourth, although this study identified weaknesses in collaboration assessment, the

design and validity testing of the assessment instruments were not the primary focus of this study. Therefore, further research is needed to develop observation-based formative assessment tools or digital analytics that can objectively measure interaction processes and individual contributions.

CONCLUSION

This study shows that elementary school teachers in Indonesia understand collaboration as a moral and social practice rooted in local cultural values, such as mutual cooperation, empathy, and shared responsibility, which integrates students' cognitive and affective dimensions. Teachers implement pedagogical strategies such as project-based learning, group discussions, and social reflection to encourage active participation, communication, and collaborative problem-solving, although their practices are still constrained by time constraints, individual dominance, ability gaps, and teachers' limited capacity to formatively assess the collaborative process. These findings emphasize the importance of multi-level synergy between teachers' moral understanding, pedagogical capacity, and institutional support to build collaborative competencies that are sustainable, globally relevant, and rooted in local culture. This research also opens up opportunities for further studies with broader scope, longitudinal designs, and the development of digital observational or analytical instruments to more objectively assess individual interactions and contributions.

REFERENCES

- Alharbi, N. M., Athauda, R. I., & Chiong, R. (2018). Empowering collaboration in project-based learning using a scripted environment: lessons learned from analysing instructors' needs. *Technology, Pedagogy and Education*, 27(3), 381–397. <https://doi.org/10.1080/1475939X.2018.1473289>
- Anggraini, A. E., Mardhatillah, Oktaviani Adhi Subuatningsih, Oriza Zativalen, Khusnul Khotimah, & Enio Kang Mohd Sufian Kang. (2024). Thematic Learning Tools Based on Collaborative Learning Models for Grade IV Elementary School. *International Journal of Elementary Education*, 8(4), 670–678. <https://doi.org/10.23887/ijee.v8i4.89714>
- Ayu, L., Murda, F., & Flora, H. (2015). *The effectiveness of collaborative learning in improving students' speaking skills*. 4(4), 2. <https://www.neliti.com/publications/192071/the-effectiveness-of-collaborative-learning-in-improving-students-speaking-skill>

- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597. <https://doi.org/10.1080/2159676X.2019.1628806>
- Campbell, E. (2014). *Teaching ethically as a moral condition of professionalism*. In *Handbook of moral and character education*. Routledge.
- Corbin, J., & Strauss, A. (2014). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Fifth Edit). SAGE Publications, Inc.
- Fullan, M. (2016). *The new meaning of educational change*. Teachers College Press.
- Hennessy, S., & Davies, M. (2019). *Teacher professional development to support classroom dialogue: Challenges and promises*. In *The Routledge international handbook of research on dialogic education*. Routledge.
- Iraola, E. A., Romero, G. R., & Millera, M. J. (2024). Dialogue among educators: Rethinking and recreating scenarios of cooperative and inclusive learning. *International Journal of Educational Research Open*, 6, 100322. <https://doi.org/10.1016/j.ijedro.2024.100322>
- Johnson, D. W., & Johnson, R. T. (2013). *Cooperative, competitive, and individualistic learning environments*. In *International guide to student achievement*. Routledge.
- Kemendikbudristek. (2023). *Laporan Evaluasi Implementasi Kurikulum Merdeka di Sekolah Dasar*.
- Kusumaningsih, S., & Sun, J. (2025). Promoting children's social-emotional skills in classrooms: Exploring the role of collaborative learning and teacher scaffolding. *Learning, Culture and Social Interaction*, 54, 100920. <https://doi.org/10.1016/j.lcsi.2025.100920>
- Lavasani, M. G., Afzali, L., Borhazadeh, S., Afzali, F., & Davoodi, M. (2011). The effect of cooperative learning on the social skills of first grade elementary school girls. *Procedia - Social and Behavioral Sciences*, 15, 1802–1805. <https://doi.org/10.1016/j.sbspro.2011.04.006>
- Le, H., Janssen, J., & Wubbels, T. (2018). Collaborative learning practices: teacher and student perceived obstacles to effective student collaboration. *Cambridge Journal of Education*, 48(1), 103–122. <https://doi.org/10.1080/0305764X.2016.1259389>

- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.
- Liu, X., Jin, W., Chen, G., Tang, C., Qian, Y., & Jin, W. (2025). Small groups nurturing collective wisdom: The punishment-prediction reinforcement learning mechanism for multi-group cooperation. *Chaos, Solitons & Fractals*, 201, 117046. <https://doi.org/10.1016/j.chaos.2025.117046>
- Mattessich, P. W., & Johnson, K. M. (2018). *Collaboration: What makes it work*. Turner Publishing Company.
- OECD. (2017). Collaborative problem solving. *OECD Education Working Papers*, 2, 241–267. <https://doi.org/10.4324/9781410603784-17>
- OECD. (2018). The Future of Education and Skills: Education 2030. *OECD Education Working Papers*, 23. [http://www.oecd.org/education/2030/E2030 Position Paper \(05.04.2018\).pdf](http://www.oecd.org/education/2030/E2030%20Position%20Paper%20(05.04.2018).pdf)
- OECD. (2023). PISA 2022 Results Factsheets Indonesia. In *Oecd* (Vol. 1). <https://oecdch.art/a40de1dbaf/C108>.
- Osiesi, M. P., & Blignaut, S. (2025). Impact of the teacher education curriculum on the development of 21st-Century skills: Pre-service teachers' perceptions. *Social Sciences & Humanities Open*, 11, 101317. <https://doi.org/10.1016/j.ssaho.2025.101317>
- Retno, R. S., Purnomo, P., Hidayat, A., & Mashfufah, A. (2025). Conceptual framework design for STEM-integrated project-based learning (PjBL-STEM) for elementary schools. *Asian Education and Development Studies*, 14(3), 579–604. <https://doi.org/10.1108/AEDS-08-2024-0188>
- Sambella, M., Hanafi, M. ., & Sholih. (2025). The Effect of Innovation Climate and Collaborative Learning on the Performance of Elementary School Teachers in Kelapa Dua District, Tangerang Regency. *International Journal of Community Engagement Payung*, 5(3), 368–378. <https://doi.org/10.58879/ijcep.v5i3.72>
- Schnepel, S., Luger, S., Wehren-Müller, M., & Moser Opitz, E. (2025). The role of teacher attitudes and collaboration for inclusive teaching practices. *Teaching and Teacher Education*, 168, 105240. <https://doi.org/10.1016/j.tate.2025.105240>
- Trilling, B., & Fadel, C. (2009). *21st Century Skills, Enhanced Edition: Learning for Life in Our Times*.

- UNESCO. (2022). *Reimagining our futures together: a new social contract for education*. the United Nations Educational, Scientific and Cultural Organization.
- Ungar, M., Ghazinour, M., & Richter, J. (2013). Annual Research Review: What is resilience within the social ecology of human development? *Journal of Child Psychology and Psychiatry*, 54(4), 348–366. <https://doi.org/10.1111/jcpp.12025>
- Varas, D., Santana, M., Nussbaum, M., Claro, S., & Imbarack, P. (2023). Teachers' strategies and challenges in teaching 21st century skills: Little common understanding. *Thinking Skills and Creativity*, 48, 101289. <https://doi.org/10.1016/j.tsc.2023.101289>
- Vygotsky, L., & Cole, M. (2018). *Lev Vygotsky: Learning and social constructivism. Learning Theories for Early Years Practice*. SAGE Publications Inc.
- Wahyudin, D., Subkhan, E., Malik, A., Hakim, M. A., Sudiapermana, E., LeliAlhapip, M., Nur Rofika Ayu Shinta Amalia, L. S., Ali, N. B. V., & Krisna, F. N. (2024). KAJIAN AKADEMIK Kurikulum Merdeka. In *Kemendikbud*.
- Yang, C., Manchanda, S., & Golshirazi, M. (2025). The collective edge: Multilevel roles of collective efficacy, Social and Emotional Learning (SEL) Competencies, and demographics in influencing teachers' compassion fatigue and satisfaction. *Journal of School Psychology*, 110, 101454. <https://doi.org/10.1016/j.jsp.2025.101454>