



Students' Collaboration Skills Profile in Case Method Learning: A Cognitive-Behavioristic Perspective

Muhammad Aqmal Nurcahyo^{1*}, Sujarwo², Bambang Saptono³, Yunika Afryaningsih⁴,
Dessy Setyowati⁵, Risdiana Andika Fatmawati⁶

^{1,3}Department of Elementary School Education, Universitas Negeri Yogyakarta, Indonesia

²Department of Non Formal Education, Universitas Negeri Yogyakarta, Indonesia

^{1,4,5,6}Elementary School Teacher Education Study Program, Universitas Nahdlatul Ulama Kalimantan Barat, Indonesia

muhammadaqmal.2023@student.uny.ac.id

ABSTRACT

Keywords:

Collaboration Skills;
Case Method;
Cognitive;
Behavioristic.

Abstract: The increasing demand for 21st century competencies highlights the importance of collaboration skills in higher education. However, limited studies have examined how integrated cognitive-behavioristic grouping strategies shape specific dimensions of students' collaboration skills. This study aims to analyze the profile of students' collaboration skills within a cognitive-behavioristic grouping framework implemented through case-method-based collaborative learning. This research employed a qualitative descriptive approach embedded in a lesson study design involving 30 third-semester students of the Elementary School Teacher Education Program. Data were collected through structured observation sheets, field notes, student worksheets, voice recordings, and documentation to ensure triangulation. Although descriptive statistics were used to calculate percentage distributions, the analysis remained qualitative-descriptive, focusing on interpreting observable collaborative behaviors across five aspects: contribution, time management, problem solving, working with others, and investigation techniques. The findings indicate that the overall collaboration skill level reached 72,83% (collaborative category), with stronger performance in interpersonal aspects than in higher-order investigative competencies. These results suggest that cognitive-behavioristic grouping effectively reinforces cooperative behaviors but requires additional cognitive scaffolding to optimize analytical and inquiry skills. The novelty of this study lies in integrating cognitive and behavioristic dimensions as a structured basis for heterogeneous grouping and in examining collaboration skills across specific measurable aspects. The study contributes theoretically to collaborative learning design by bridging behavioral engagement and cognitive depth, and practically by offering a structured grouping model that supports balanced collaborative development in higher education.

Kata Kunci:

Keterampilan Kolaborasi;
Case Method;
Kognitif;
Behavioristik.

Abstrak: Tuntutan kompetensi abad ke-21 menegaskan pentingnya keterampilan kolaborasi dalam pendidikan tinggi. Namun, penelitian yang mengkaji bagaimana strategi pengelompokan berbasis kognitif-behavioristik memengaruhi dimensi spesifik keterampilan kolaborasi masih terbatas. Penelitian ini bertujuan untuk menganalisis profil keterampilan kolaborasi mahasiswa dalam kerangka pengelompokan kognitif-behavioristik yang diimplementasikan melalui pembelajaran kolaboratif berbasis *case method*. Penelitian ini menggunakan pendekatan kualitatif deskriptif yang terintegrasi dalam desain lesson study dengan melibatkan 30 mahasiswa semester III Program Studi Pendidikan Guru Sekolah Dasar. Data dikumpulkan melalui lembar observasi terstruktur, catatan lapangan, lembar kerja mahasiswa, rekaman suara, dan dokumentasi untuk menjamin triangulasi data. Meskipun statistik deskriptif digunakan untuk menghitung persentase, analisis tetap berorientasi kualitatif dengan fokus pada interpretasi perilaku kolaboratif yang teramati pada lima aspek, yaitu kontribusi, manajemen waktu, pemecahan masalah, bekerja sama, dan teknik investigasi. Hasil penelitian menunjukkan bahwa tingkat keterampilan kolaborasi secara keseluruhan mencapai 72,83% (kategori kolaboratif), dengan kekuatan pada aspek interpersonal dibandingkan aspek investigatif tingkat tinggi. Temuan ini menunjukkan bahwa pengelompokan kognitif-behavioristik efektif memperkuat perilaku kooperatif, namun masih memerlukan *scaffolding* kognitif untuk mengoptimalkan kemampuan analitis dan inkuiri. Kebaruan penelitian ini terletak pada integrasi dimensi kognitif dan behavioristik sebagai dasar pengelompokan heterogen serta pengukuran keterampilan kolaborasi secara spesifik. Penelitian ini berkontribusi secara teoretis dalam menjembatani dimensi perilaku dan kognitif dalam desain pembelajaran kolaboratif, serta secara praktis menawarkan model pengelompokan yang mendukung pengembangan kolaborasi yang lebih seimbang di pendidikan tinggi.

Article History:

Received : 12-02-2026
Revised : 02-03-2026
Accepted : 02-03-2026
Online : 01-04-2026



<https://doi.org/10.31764/pendekar.v9i1.38316>



This is an open access article under the **CC-BY-SA** license

A. INTRODUCTION

The demands of 21st century education require universities to prepare graduates who are adaptive, critical, and capable of addressing complex real-world challenges (Ali Siming et al., 2025; Herlinawati et al., 2024). Among the essential competencies widely recognized in higher education

are critical thinking, creativity, communication, and collaboration (4C) (Handayani et al., 2023; Weng & Chiu, 2024). Of these, collaboration plays a central role, as professional and social contexts increasingly require individuals to work effectively in diverse teams (Khoiri et al., 2021).

Collaborative learning has been widely implemented as a student-centered approach to promote active participation and higher-order thinking. Empirical evidence consistently shows that collaborative learning enhances analytical skills, academic achievement, and social interaction (Kaendler et al., 2015; Lou et al., 1996). Conceptually, collaborative learning refers to a structured instructional effort in which learners work together in designed situations to achieve shared learning goals (Kaendler et al., 2015; Rahman et al., 2022). Through this process, students are encouraged to articulate ideas, negotiate meaning, and construct knowledge collectively, thereby strengthening cognitive engagement and analytical thinking (Hanik & Harsono, 2020). Despite its documented effectiveness, most prior studies focus primarily on learning outcomes and general effectiveness rather than examining how collaboration skills develop under specific grouping strategies.

One key factor influencing collaborative learning effectiveness is group composition. Grouping strategies are commonly based on cognitive ability levels, with heterogeneous grouping shown to improve interaction and achievement (Lou et al., 1996; Saleh et al., 2005). However, collaboration is not shaped solely by cognitive competence. Behavioral and affective characteristics, such as motivation, attitudes, engagement, and responsiveness also play a crucial role in shaping group dynamics (Scager et al., 2016; Schindler & Bakker, 2020). While these dimensions are acknowledged in theory, empirical studies rarely integrate cognitive and behavioral considerations simultaneously when organizing collaborative groups. This limitation creates a gap in understanding how integrated grouping strategies influence specific dimensions of students' collaboration skills.

From a theoretical standpoint, cognitive aspects relate to students' knowledge structures, reasoning abilities, and problem-solving capacity, whereas behavioristic perspectives emphasize observable behaviors shaped through stimulus–response interactions and reinforcement processes (Sanjaya, 2013). In collaborative contexts, cognitive factors influence the quality of ideas and analytical contributions, while behavioral factors affect participation, responsiveness, and engagement. Integrating these perspectives offers a more comprehensive foundation for designing heterogeneous groups that balance intellectual contribution and interactive participation.

Based on this rationale, the present study organizes collaborative learning using a cognitive-behavioristic grouping framework. Students were assigned to heterogeneous groups considering both their level of knowledge, categorized as low, moderate, and high based on portfolio analysis and their observed affective and behavioral characteristics from previous learning activities. Portfolio-based assessment provides a longitudinal representation of students' academic performance and development (Zaabalawi & Zaabalawi, 2024), while affective indicators such as motivation and engagement influence interaction quality within groups (Scager et al., 2016). By integrating cognitive and behavioral dimensions in group formation, this study seeks to examine how such an approach shapes the profile of students' collaboration skills, thereby addressing the existing research gap.

This gap indicates the need for a more integrative approach that combines cognitive and behavioristic perspectives in organizing collaborative learning. A cognitive-behavioristic framework allows grouping decisions to consider both students' knowledge levels and observable behavioral tendencies, potentially creating more balanced and meaningful interactions. In this study, collaborative learning was implemented through a case method approach, which situates learning within authentic problem contexts. Case-based learning encourages students to engage in discussion, decision making, and collective problem solving, thereby fostering interaction and shared responsibility (Andayani et al., 2022; Mayer & Clark, 2003). However, while case-based collaborative learning is widely acknowledged for promoting active engagement, empirical evidence examining

how cognitive-behavioristic grouping influences specific dimensions of collaboration skills remains limited.

To systematically examine these dimensions, students' collaboration skills were assessed using a rubric adapted from Hermawan et al. (2017), which encompasses five key aspects: contribution, time management, problem solving, working with others, and investigation techniques. The description is presented in Table 1 below.

Table 1. *Aspects of Collaboration Skills*

No.	Aspects	Description
1	Contribution	Provide ideas that become a reference in discussions, lead discussions, and contribute to participation.
2	Time management	Completes tasks on time or completes before the deadline so that it never causes the group to extend the time limit for its work.
3	Problem solving	Make a clear effort to find and give your own ideas to answer the problem.
4	Work with others	Listen well to the opinions of others and help others making it easier in group work.
5	Investigation techniques	Search for various sources and always record information in detail.

(Source: Hermawan et al., 2017)

Therefore, this study aims to analyze the profile of students' collaboration skills within a cognitive-behavioristic grouping framework implemented through case-method-based collaborative learning. The novelty of this study consists of: (1) integrating cognitive and behavioristic dimensions as a basis for heterogeneous grouping; and (2) examining collaboration skills across specific aspects, including contribution, time management, problem solving, working with others, and investigation techniques. By addressing this gap, the study contributes theoretically to the refinement of collaborative learning design frameworks and practically to the development of structured grouping strategies that support balanced behavioral and cognitive engagement in higher education contexts.

B. METHOD

This study employed a qualitative descriptive approach embedded within a lesson study framework. The qualitative approach was selected to explore and describe students' collaboration skills as they naturally occurred during classroom interactions. Although descriptive statistics were used to present percentage distributions, the primary orientation of the study remained qualitative, focusing on systematic observation and interpretation of collaborative behaviors. The participants were 30 third-semester students (Class A) of the Elementary School Teacher Education Study Program enrolled in the Learning Resources and Media course. The study was conducted through three systematic stages of lesson study to ensure replicability. In the "Plan" stage, lecturers collaboratively designed the lesson plan, learning materials, case-based worksheets, collaboration assessment rubric, and observation instruments. At this stage, the cognitive-behavioristic grouping strategy was also determined to form heterogeneous groups based on students' knowledge levels and behavioral characteristics.

In the "Do" stage (open class implementation), the planned lesson was implemented in the classroom. Students were organized into six heterogeneous groups to solve case-based problems related to the types and characteristics of learning media. During this phase, 12 observers (two assigned to each group) systematically observed collaborative interactions using standardized observation sheets. Voice recorders and documentation tools were used to capture students' dialogue and overall classroom dynamics. Finally, in the "See" stage (reflection), the teaching team and observers conducted reflective discussions to analyze the observed collaborative behaviors, identify strengths and areas for improvement, and validate the observational findings. This reflective

process strengthened the credibility of the interpretations. By clearly outlining these three stages, the lesson study design can be replicated in similar instructional contexts.

Data were collected using multiple instruments to ensure methodological triangulation. Observation sheets were employed to assess five aspects of collaboration skills, while field notes documented contextual and unexpected findings during the learning process. Student worksheets were analyzed to examine task completion and reasoning patterns. In addition, voice recordings captured interactive dialogue among students, and documentation in the form of photographs and videos supported contextual verification of classroom activities. The use of these varied instruments strengthened the credibility of the data through source triangulation.

To enhance content validity, the collaboration rubric was developed based on established theoretical frameworks of collaborative learning and was reviewed by experts in educational methodology prior to implementation. Revisions were made based on expert feedback to ensure alignment between indicators and observable behaviors. Reliability was supported through inter-observer agreement. Each group was observed by two trained observers, and scoring discrepancies were discussed during the reflection stage to achieve consensus. This mechanism reduced subjective bias and improved consistency in scoring. Data analysis followed a structured procedure consistent with the qualitative descriptive approach. Observational data were first tabulated, and the frequency of observed behaviors was converted into percentages using the formula:

$$P = f / n \times 100 \% \quad (1)$$

(Source: Riduwan, 2004)

Although percentages were calculated, they were used solely to describe patterns of collaboration rather than to test hypotheses. The results were then categorized according to established collaboration skill criteria.

Table 2. *Collaboration Skills Criteria*

Percentage (%)	Categories
> 80	Highly collaborative
> 60 – 80	Collaborative
> 40 – 60	Simply collaborative
> 20 – 40	Less collaborative
≤ 20	Not collaborative

(Source: Widoyoko, 2009)

These categories were used to interpret the level of students' collaboration skills descriptively.

C. RESULT

The profile of students' collaboration skills in the Elementary School Teacher Education Program (PGSD) in the Learning Resources and Media course was obtained through classroom observations using an assessment rubric covering five aspects: contribution, time management, problem solving, working with others, and investigation techniques. Each aspect was scored on a scale of 1-4. Students were divided into six groups of five members based on cognitive and behavioral characteristics, including levels of knowledge (low, moderate, high), as well as interests, attitudes, and learning dispositions. The study involved 12 observers, with two observers assigned to each group. Data were collected using observation sheets, field notes, voice recordings, and classroom video documentation.

During the session, students worked on case-based worksheets related to the types and characteristics of learning media (audio, visual, and audiovisual) and determined appropriate media for different grade levels. After group discussions, each group presented their results, followed by

lecturer feedback and clarification. Collaboration data were analyzed by calculating individual percentages, group averages, and averages for each collaboration aspect based on the completed observation sheets. The results of the percentage distribution for individual students' collaboration skills are presented below.

Table 3. *Percentage Distribution of Student's Collaboration Skills*

No.	Name	Percentage (%)	Categories
1	M1	55	Simply Collaborative
2	M2	85	Collaborative
3	M3	60	Simply Collaborative
4	M4	90	Highly Collaborative
5	M5	80	Collaborative
6	M6	85	Highly Collaborative
7	M7	55	Simply Collaborative
8	M8	55	Simply Collaborative
9	M9	90	Highly Collaborative
10	M10	75	Collaborative
11	M11	90	Highly Collaborative
12	M12	35	Less Collaborative
13	M13	85	Highly Collaborative
14	M14	95	Highly Collaborative
15	M15	75	Collaborative
16	M16	35	Less Collaborative
17	M17	75	Collaborative
18	M18	95	Highly Collaborative
19	M19	75	Collaborative
20	M20	80	Collaborative
21	M21	45	Simply Collaborative
22	M22	50	Simply Collaborative
23	M23	95	Highly Collaborative
24	M24	80	Collaborative
25	M25	80	Collaborative
26	M26	50	Simply Collaborative
27	M27	40	Less Collaborative
28	M28	90	Highly Collaborative
29	M29	95	Highly Collaborative
30	M30	80	Collaborative

Based on the percentage distribution of individual students' collaboration skills, 10 students (33,3%) were categorized as highly collaborative and another 10 students (33,3%) as collaborative. Meanwhile, 7 students (23,3%) were classified as fairly collaborative, and 3 students (10%) as less collaborative. These results indicate that the majority of students (66,6%) fall within the collaborative and highly collaborative categories. Furthermore, the average collaboration skill scores for each group are presented below.

Table 4. *Average Collaboration Skills Scores by Group*

No.	Group	Percentage (%)	Categories
1	K1	74	Collaborative
2	K2	74	Collaborative
3	K3	76	Collaborative
4	K4	72	Collaborative
5	K5	70	Collaborative
6	K6	71	Collaborative
Average		72,83	Collaborative

The average recapitulation of collaboration skills by group shows that all six groups were categorized as collaborative, with an overall average of 72,83%. This suggests that the cognitive-behavioristic grouping strategy resulted in relatively balanced collaboration performance across groups. In addition, the average collaboration skill scores for each aspect were calculated and are presented below.

Table 5. *Average Collaboration Skills Scores by Aspect*

No.	Aspects	Percentage (%)	Categories
1	Contribution	73,33	Collaborative
2	Time management	73,33	Collaborative
3	Problem solving	70	Collaborative
4	Work with others	78,33	Collaborative
5	Investigation techniques	69,17	Collaborative
	Average	72,83	Collaborative

Based on the data, collaboration skills across aspects ranked from highest to lowest as follows: working with others (78,33%), contribution (73,33%), time management (73,33%), problem solving (70%), and investigation techniques (69,17%). These results indicate that students demonstrate stronger interpersonal collaboration skills than higher-order investigative competencies. The findings reveal a consistent pattern: students demonstrate stronger performance in interpersonal dimensions of collaboration, particularly in working with others, contribution, and time management, while higher-order cognitive aspects such as problem solving and investigation techniques show comparatively lower scores. This pattern can be interpreted through an integrated cognitive-behavioristic framework. The high score in "working with others" (78,33%) suggests that students have developed stable cooperative behaviors. From a behavioristic perspective, repeated exposure to structured group discussions functions as reinforcement, shaping adaptive social responses such as listening, sharing responsibilities, and mutual assistance. According to social learning theory, behavior is formed through modeling and reinforcement within social contexts (Bandura, 1977).

Collaborative learning environments provide consistent opportunities for such reinforcement, leading to internalized cooperative habits. Empirical evidence confirms that structured cooperative learning enhances positive interdependence and interpersonal relationships (Johnson & Johnson, 2009; Lou et al., 1996). Moreover, the moderate yet stable scores in contribution and time management (both 73,33%) indicate emerging group regulation skills. Effective collaborative groups typically exhibit distributed leadership and shared responsibility (Barron, 2003). These findings align with research showing that collaborative engagement improves when group members actively coordinate tasks and monitor progress.

However, recent research emphasizes that behavioral engagement alone does not guarantee deep learning. Järvelä et al. (2016) argue that regulation in collaborative settings must extend beyond observable participation to include cognitive and metacognitive coordination. The lower scores in problem solving (70%) and investigation techniques (69,17%) indicate that while students participate actively, the depth of cognitive processing may remain limited. From a cognitive perspective, effective collaboration requires elaboration, argumentation, and integration of diverse viewpoints. Research on collaborative problem solving highlights that successful group outcomes depend on the integration of social interaction with analytical reasoning (Fiore et al., 2018). When discussions are not supported by structured inquiry prompts, they often remain descriptive rather than analytical.

Furthermore, regulation in collaborative learning encompasses self-regulation, co-regulation, and socially shared regulation of learning (Hadwin et al., 2011). The findings of this study suggest that students demonstrate behavioral coordination (task division and time management), but shared cognitive regulation, such as jointly constructing arguments or critically evaluating evidence requires further development. The relatively lower performance in investigation techniques also reflects

limitations in information literacy and inquiry competence. In higher education contexts, effective collaboration increasingly depends on the ability to locate, evaluate, and synthesize multiple information sources. (Chu et al., 2009) found that inquiry-based learning significantly enhances both collaborative skills and information literacy when explicit scaffolds are provided. Additionally, argumentation-based collaborative learning has been shown to significantly improve higher-order thinking skills when learners are guided to justify claims and evaluate counterarguments (Noroozi et al., 2012). Without such scaffolding, collaborative interaction may remain socially active but cognitively shallow.

The cognitive-behavioristic grouping implemented in this study appears effective in establishing foundational collaborative behaviors. Students exhibit stable interpersonal engagement, active participation, and shared responsibility. These outcomes reflect the strength of behavioristic reinforcement within structured group environments. However, the findings also demonstrate that behavioral collaboration does not automatically translate into advanced cognitive engagement. From a cognitive-behavioristic standpoint, optimal collaborative learning occurs when observable cooperative behaviors are reinforced while simultaneously supported by structured cognitive scaffolding. This interpretation aligns with the broader literature on collaborative learning, which emphasizes that meaningful knowledge construction requires both social interaction and epistemic engagement (Hmelo-Silver, 2004). Thus, instructional design must move beyond organizing students into heterogeneous groups and instead incorporate explicit prompts for argumentation, inquiry, and shared regulation.

D. CONCLUSION

This study demonstrates that case-method-based collaborative learning supported by cognitive-behavioristic grouping effectively promotes students' collaboration skills, as reflected in the overall score of 72,83% (collaborative category). The findings show strong interpersonal engagement, particularly in working with others, contribution, and time management. However, higher-order cognitive dimensions, especially investigation techniques and problem solving, remain comparatively less developed. This indicates that behavioral participation does not automatically translate into deep analytical reasoning or systematic inquiry. Theoretically, this study contributes to the understanding that a cognitive-behavioristic framework functions not only as a grouping strategy but also as an analytical lens to explain the gap between strong interpersonal collaboration and weaker investigative competencies. Practically, the findings suggest that collaborative learning environments should integrate structured inquiry prompts, argumentation scaffolds, shared regulation strategies, and explicit information literacy training. Such integration would ensure balanced development between behavioral engagement and higher-order cognitive processing.

Future research should examine the quality of interactive dialogue during collaborative discussions, particularly how argumentation patterns and shared regulation influence cognitive outcomes. Experimental studies comparing different scaffolding models are also recommended to identify strategies that most effectively strengthen both behavioral and cognitive dimensions of collaboration. In summary, collaborative learning effectively cultivates interpersonal participation and social responsibility. However, optimizing cognitive and investigative outcomes requires intentional instructional scaffolding that targets higher-order reasoning and shared epistemic regulation.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to students of Elementary School Teacher Education Study Program and observers who contributed to this study.

REFERENCES

- Ali Siming, I., Nandwani, S., Shaikh, F., & Insaf, R. (2025). Are Universities Preparing Students for the 21st Century? A Survey on Students' Perceptions and Readiness. *Journal of Asian Development Studies*, 14(1), 1614–1623. <https://doi.org/10.62345/jads.2025.14.1.128>
- Andayani, E., Mustikowati, R. I., Setiyowati, S. W., & Firdaus, R. M. (2022). Case Method: Mengoptimalkan Critical Thinking, Creativity Communication Skills dan Collaboratively Mahasiswa Sesuai MBKM di Era Abad 21. *Jurnal Penelitian dan Pendidikan IPS (JPPI)*, 16(1), 52–60. <https://ejournal.unikama.ac.id/index.php/JPPI/article/view/6973/3460>
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215. <https://doi.org/10.1037/0033-295X.84.2.191>
- Barron, B. (2003). When Smart Groups Fail. *Journal of the Learning Sciences*, 12(3), 307–359. https://doi.org/10.1207/S15327809JLS1203_1
- Chu, S. K. W., Chow, K., & Tse, S. (2009). The development of students' information literacy and IT skills via inquiry PBL and collaborative teaching. *Proceedings of the American Society for Information Science and Technology*, 46(1), 1–22. <https://doi.org/10.1002/meet.2009.1450460245>
- Fiore, S. M., Graesser, A., & Greiff, S. (2018). Collaborative problem-solving education for the twenty-first-century workforce. *Nature Human Behaviour*, 2(6), 367–369. <https://doi.org/10.1038/s41562-018-0363-y>
- Hadwin, A., Järvelä, S., & Miller, M. (2011). *Self-regulated, co-regulated, and socially shared regulation of learning in collaborative learning environments* (pp. 65–84).
- Handayani, P. H., Marbun, S., & Novitri, D. M. (2023). 21st Century Learning: 4C Skills in Case Method and Team Based Project Learning. *Elementary School Journal PGSD Fip Unimed*, 13(2), 181. <https://doi.org/10.24114/esjpgsd.v13i2.44522>
- Hanik, N. R., & Harsono, S. (2020). Implementasi Model Pembelajaran Komparasi yang Diintegrasikan dengan Pendekatan Kolaboratif Ditinjau dari Kemampuan Analisis Mahasiswa. *Jurnal Komunikasi Pendidikan*, 4(2), 114. <https://doi.org/10.32585/jkp.v4i2.681>
- Herlinawati, H., Marwa, M., Ismail, N., Junaidi, Liza, L. O., & Situmorang, D. D. B. (2024). The integration of 21st century skills in the curriculum of education. *Heliyon*, 10(15), e35148. <https://doi.org/10.1016/j.heliyon.2024.e35148>
- Hermawan, H., Siahaan, P., Suhendi, E., Kaniawati, I., Samsudin, A., Setyadin, A. H., & Hidayat, S. R. (2017). Desain Instrumen Rubrik Kemampuan Berkolaborasi Siswa SMP dalam Materi Pemantulan Cahaya. *Jurnal Penelitian & Pengembangan Pendidikan Fisika*, 3(2), 167–174. <https://doi.org/10.21009/1.03207>
- Hmelo-Silver, C. E. (2004). Problem-Based Learning: What and How Do Students Learn? *Educational Psychology Review*, 16(3), 235–266. <https://doi.org/10.1023/B:EDPR.0000034022.16470.f3>
- Järvelä, S., Kirschner, P. A., Hadwin, A., Järvenoja, H., Malmberg, J., Miller, M., & Laru, J. (2016). Socially shared regulation of learning in CSCL: understanding and prompting individual- and group-level shared regulatory activities. *International Journal of Computer-Supported Collaborative Learning*, 11(3), 263–280. <https://doi.org/10.1007/s11412-016-9238-2>
- Johnson, D. W., & Johnson, R. T. (2009). An educational psychology success story: Social interdependence theory and cooperative learning. *Educational Researcher*, 38(5), 365–379. <https://doi.org/10.3102/0013189X09339057>
- Kaendler, C., Wiedmann, M., Rummel, N., & Spada, H. (2015). Teacher competencies for the implementation of collaborative learning in the classroom: A framework and research review. *Educational Psychology Review*, 27(3), 505–536. <https://doi.org/10.1007/s10648-014-9288-9>
- Khoiri, A., Evalina, Komariah, N., Utami, R. T., Paramarta, V., Siswandi, Janudin, & Sunarsi, D. (2021). 4Cs Analysis of 21st Century Skills-Based School Areas. *Journal of Physics: Conference Series*, 1764(1), 012142. <https://doi.org/10.1088/1742-6596/1764/1/012142>
- Lou, Y., Abrami, P. C., Spence, J. C., Poulsen, C., Chambers, B., & D'Apollonia, S. (1996). Within-Class Grouping: A Meta-Analysis. *Review of Educational Research*, 66(4), 423–458. <https://doi.org/10.3102/00346543066004423>
- Mayer, R. E., & Clark, R. (2003). The promise of educational psychology (vol II): Teaching for meaningful learning. *Performance Improvement*, 42(4), 41–43. <https://doi.org/10.1002/pfi.4930420410>
- Noroozi, O., Weinberger, A., Biemans, H. J. A., Mulder, M., & Chizari, M. (2012). Argumentation-Based Computer Supported Collaborative Learning (ABCSCCL): A synthesis of 15 years of research. *Educational Research Review*, 7(2), 79–106. <https://doi.org/10.1016/j.edurev.2011.11.006>
- Rahman, A., Masitoh, S., & Mariono, A. (2022). Collaborative Learning to Improve Creative and Critical Thinking Skills: From Research Design to Data Analysis. *International Journal of Educational Review*, 4(1), 79–96. <https://doi.org/10.33369/ijer.v4i1.22016>
- Riduwan. (2004). *Metode dan teknik menyusun tesis*. Alfabeta.

- Saleh, M., Lazonder, A. W., & De Jong, T. (2005). Effects of within-class ability grouping on social interaction, achievement, and motivation. *Instructional Science*, *33*(2), 105–119. <https://doi.org/10.1007/s11251-004-6405-z>
- Sanjaya, W. (2013). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*. Kencana.
- Scager, K., Boonstra, J., Peeters, T., Vulperhorst, J., & Wiegant, F. (2016). Collaborative learning in higher education: Evoking positive interdependence. *CBE Life Sciences Education*, *15*(4), 1–9. <https://doi.org/10.1187/cbe.16-07-0219>
- Schindler, M., & Bakker, A. (2020). Affective field during collaborative problem posing and problem solving: a case study. *Educational Studies in Mathematics*, *105*(3), 303–324. <https://doi.org/10.1007/s10649-020-09973-0>
- Weng, X., & Chiu, T. K. F. (2024). The mediating effects of engagement on the relationship between perceived digital inquiry and creativity. *Journal of Research on Technology in Education*, *56*(4), 431–443. <https://doi.org/10.1080/15391523.2022.2160392>
- Widoyoko, E. P. (2009). *Evaluasi Program Pembelajaran*. Pustaka Pelajar.
- Zaabalawi, R. S., & Zaabalawi, J. (2024). Portfolios versus exams: a study to gauge the better student assessment tool. *Language Testing in Asia*, *14*(1), 28. <https://doi.org/10.1186/s40468-024-00296-y>