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PRELIMINARY STUDY: COLLABORATION SKILLS IN SCIENCE LESSONS FOR GRADE IV PRIMARY SCHOOL LEARNERS

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ABSTRAK

Keterampilan kolaborasi sebagai salah satu bagian dari urgensi pembelajaran di abad 21 memiliki posisi yang krusial bagi peserta didik tingkat sekolah dasar. Wacana peningkatan penelitian di bidang pendidikan ini tidak sejalan dengan minimnya penelitian yang membahas terkait keterampilan kolaborasi peserta didik untuk berpartisipasi dalam kelompok secara komprehensif. Studi ini bertujuan untuk mengisi kesenjangan tersebut dengan mengeksplorasi kondisi awal keterampilan kolaborasi 126 peserta didik kelas IV di tiga sekolah dasar di Kabupaten Sleman, Yogyakarta secara mendalam. Peneliti merinci hasil analisis studi kasus terhadap keterampilan kolaborasi peserta didik di sekolah dasar. Seratus dua puluh enam peserta didik kelas IV di tiga sekolah dasar di kabupaten Slema terpilih untuk diobservasi. Observasi semi-terstruktur, wawancara semi-terstruktur, dan beberapan dokumen hadir sebagai instrument untuk mengumpulkan data kondisi awal terkait keterampilan kolaborasi peserta didik. Hasilnya menunjukkan perlunya pengembangan keterampilan kolaborasi peserta didik melalui inovasi media pembelajaran yang berorientasi pada karakteristik gaya belajar peserta didik yang beragam. Studi ini berimplikasi pada pentingnya meningkatkan keterampilan kolaborasi peserta didik pada pembelajaran IPA dalam kurikulum melalui inovasi media pembelajaran yang disesuaikan dengan kebutuhan gaya belajar peserta didik serta dapat memberikan pedoman pembelajaran mandiri bagi peserta didik dalam mempersiapkan dirinya untuk menghadapi tuntutan keterampilan abad ke-21.

Kata Kunci: Studi Pendahuluan; Keterampilan Kolaborasi; Pelajaran Sains

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ABSTRACT

Collaboration skills as part of the urgency of learning in the 21st century have a crucial position for elementary school students. The discourse on increasing research in the field of education is not in line with the lack of research that discusses students' collaboration skills to participate in groups comprehensively. This study aims to fill this gap by exploring the initial condition of collaboration skills of 126 grade IV students in three elementary schools in Sleman Regency, Yogyakarta in depth. The researcher detailed the results of the case study analysis on students' collaboration skills in elementary school. One hundred and twenty-six grade IV students in three elementary schools in Sleman district were selected for observation. Semi-structured observations, semi-structured interviews, and several documents are present as instruments to collect data on initial conditions related to students' collaboration skills. The results show the need to develop students' collaboration skills through learning media innovations that are oriented to the characteristics of diverse student learning styles. This study has implications for the importance of improving students' collaboration skills in science learning in the curriculum through learning media innovations that are tailored to the needs of students' learning styles and can provide independent learning guidelines for students in preparing themselves to face the demands of 21st century skills.

Keywords*: Preliminary Study; Collaboration Skills; Science Lessons*

INTRODUCTION

The increasing demands of 21st century learning are a challenge for students to be able to adapt to the demands of the world. The development of information and communication technology has changed the way individuals interact, work, and learn. Therefore, learning can no longer focus only on factual knowledge transfer, but must prepare students with a set of relevant skills to be able to survive and succeed in the future.[1] This paradigm shift is known as 21st century learning. 21st century learning emphasizes the development of essential skills, including critical thinking, creativity, collaboration, and communication.[2]

[1] Wahyuni, M. T., Rodhiah, R. T. A., & Fahillah, M. (2025). Strategi peningkatan keterampilan abad ke-21 siswa SD dengan memanfaatkan aliran filsafat rekonstruksionisme. *JEMARI (Jurnal Edukasi Madrasah Ibtidaiyah)*, *7*(2), 88–103. https://doi.org/10.30599/0cbvwb74

[2] Mantau, B. A. K., & Talango, S. R. (2023). Pengintegrasian keterampilan abad 21 dalam proses pembelajaran (literature review). *Irfani*, *19*(1), 86–107. https://doi.org/10.30603/ir.v19i1.3897

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Collaboration skills play a central role in learning. The ability to work together in a team, listen to the perspectives of others, and contribute constructively is the foundation of innovation.[3] In the modern world of work, many complex problems cannot be solved by one individual alone. On the contrary, collaboration from various parties with diverse expertise is needed.[4] An individual can be said to have the right collaboration skills if he has an active contribution to learning, works productively, is responsible, shows flexibility, and has an appreciative attitude.[5] Learning by fostering collaboration skills in students makes it easier for them to understand learning[6] and can train students in effective division of labor, improve character, student responsibility, combining information from various sources of knowledge, perspectives, experiences, and cohesiveness.[7] In addition, collaborative learning can have a positive influence on students' academic writing skills.[8] [9]

Collaboration skills are the work of students in groups in the process of solving problems based on their understanding of the material that has been learned. This is closely related to science learning.[10] The ideal condition of collaboration skills in science learning is in contrast to the field facts that occur, namely that students are found to use group work time in class to do things that

[3] Fadhlurrohman, M. T., & Wardhany, Z. (2024). Pengaruh budaya kolaboratif dan lingkungan kerja yang kondusif terhadap kinerja karyawan it di organisasi BRIN. *Jurnal Manajemen Bisnis Era Digital*, *1*(2), 204–216. https://doi.org/10.61132/jumabedi.v1i2.116

[4] Supratman. (2021). Kolaborasi dalam komunikasi kelompok menurut teori strukturasi anthony gidden. *Intelektiva*, *03*(04), 156–164. https://www.jurnalintelektiva.com/index.php/jurnal/article/download/675/511

[5] Greenstein, L. (2012). *Assessing 21st century skills: A guide to evaluating mastery and authentic learning*. California: Corwin.

[6] Junita, J., & Wardani, K. W. (2020). Efektivitas model pembelajaran STAD dan CIRC terhadap peningkatan keterampilan kolaborasi siswa kelas V SD Gugus Joko Tingkir pada mata pelajaran tematik. *JPDI (Jurnal Pendidikan Dasar Indonesia)*, *5*(1), 11–17. https://doi.org/10.26737/jpdi.v5i1.1688

[7] Ulhusna, M., Putri, S. D., & Zakirman, Z. (2020). Permainan Ludo untuk meningkatkan keterampilan kolaborasi siswa dalam pembelajaran matematika. *International Journal of Elementary Education*, *4*(2), 130. https://doi.org/10.23887/ijee.v4i2.23050

[8] Hoang, D. T. N., & Hoang, T. (2024). Enhancing EFL students' academic writing skills in online learning via Google Docs-based collaboration: a mixed-methods study. *Computer Assisted Language Learning*, *37*(7), 1504–1526. https://doi.org/10.1080/09588221.2022.2083176

[9] Li, J., & Mak, L. (2022). The effects of using an online collaboration tool on college students' learning of academic writing skills. *System*, *105*(March 2021), 1–14. https://doi.org/10.1016/j.system.2021.102712

[10] Afdilla, A. N., Rednoningsih, T., & Sukaesih, S. (2024). Peningkatan keterampilan kolaborasi melalui model discovery learning pada pembelajaran IPA kelas VIII B SMP Negeri 4 Semarang. *Seminar Nasional Pendidikan Dan Penelitian Tindakan Kelas*, 99–111. https://proceeding.unnes.ac.id/snpptk/article/view/3134

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are not related to learning.[11] Discussion activities where there are only a few active students and other students do not follow closely indicate the low collaboration skills of students.[12] The same thing was also found during unstructured interviews conducted with grade IV science teachers, namely students' collaboration skills tended to be low and lacking if assigned in groups. There are students who are individualistic and do not want to cooperate and contribute in groups to solve the assigned problems, a condition that is found during unstructured observations made during the learning process in the classroom.

Collaboration skills research that has been conducted previously found that the use of the discovery learning model can improve the collaboration skills of junior high school students[13]; the implementation of the jigsaw model in learning has been proven to have the potential to improve students' collaboration skills[14]; the application of the ASICC learning model can be one of the hopes to develop students' collaboration skills[15]; and scientific-based student worksheets in learning have a positive influence on students' collaboration skills[16] [17]. Several relevant research results prove that there are several innovative learning model innovations and strategies that are effective to improve collaboration skills. However, there has been no research that has comprehensively examined the condition of students' collaboration skills, especially in science learning at the

[11] Nurwahidah, N., Samsuri, T., Mirawati, B., & Indriati, I. (2021). Meningkatkan keterampilan kolaborasi siswa menggunakan lembar kerja siswa berbasis saintifik. *Reflection Journal*, *1*(2), 70–76. https://doi.org/10.36312/rj.v1i2.556

[12] Alimah, S., & Utami, L. (2019). Human reproduction contextual case-based worksheet to improve students' interpersonal communication and collaboration skills. *Biosaintifika: Journal of Biology & Biology Education*, *11*(2), 256–263. https://doi.org/10.15294/biosaintifika.v11i2.19760

[13] Afdilla, A. N., Rednoningsih, T., & Sukaesih, S. (2024). Peningkatan keterampilan kolaborasi melalui model discovery learning pada pembelajaran IPA kelas VIII B SMP Negeri 4 Semarang. *Seminar Nasional Pendidikan Dan Penelitian Tindakan Kelas*, 99–111. https://proceeding.unnes.ac.id/snpptk/article/view/3134

[14] Gusta, W., Christina, D., & Zakirman. (2020). Improved student collaboration skills on english learning using jigsaw models. *International Journal of Scientific and Technology Research*, *9*(3), 1051–1056. http://repository.upiyptk.ac.id/3107/

[15] Santoso, A. M., Primandiri, P. R., Zubaidah, S., & Amin, M. (2021). Improving student collaboration and critical thinking skills through ASICC model learning. *Journal of Physics: Conference Series*, *1806*(1). https://doi.org/10.1088/1742-6596/1806/1/012174

[16] Nurwahidah, N., Samsuri, T., Mirawati, B., & Indriati, I. (2021). Meningkatkan keterampilan kolaborasi siswa menggunakan lembar kerja siswa berbasis saintifik. *Reflection Journal*, *1*(2), 70–76. https://doi.org/10.36312/rj.v1i2.556

[17] Alimah, S., & Utami, L. (2019). Human reproduction contextual case-based worksheet to improve students' interpersonal communication and collaboration skills. *Biosaintifika: Journal of Biology & Biology Education*, *11*(2), 256–263. https://doi.org/10.15294/biosaintifika.v11i2.19760

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elementary school level. In addition, the lack of active participation of students underscores the urgency of conducting a more in-depth analysis related to the self-discipline of collaboration skills. The presentation of ideal conditions and factual data in the explanation above is a warning signal that requires targeted corrective action.

An alternative crucial step to design targeted and effective educational interventions in improving the quality of learning and future student performance can be done by exploring the initial preliminary study in depth related to students' collaboration skills on various indicators and identifying factors that affect students' collaboration skills. The case study research approach was applied in this study to gain insights from the in-depth exploration of students' collaboration skills in the preliminary study. This study aims to identify the initial picture of students' collaboration skills towards science learning and analyze factors that may have an influence on students' collaboration skills.

RESEARCH METHODS

This study uses a qualitative approach with the type of research used is a case study. This study was conducted from August to September 2023 in three elementary schools in the Caturtunggal cluster, namely SDN Caturtunggal 3, SDN Caturtunggal 4, and SDN Babarsari in Sleman district, Yogyakarta. The objects of this research are: (1) the initial condition of students' collaboration skills in science learning which includes 6 criteria, namely: (a) actively contributing; (b) work productively; (c) responsible; (d) demonstrate flexibility; and (e) appreciative attitude. (2) factors that allow them to have an influence on students' collaboration skills. The research students are fourth-grade students in three elementary schools in the Caturtunggal cluster, namely SDN Caturtunggal 3, SDN Caturtunggal 4, and SDN Babarsari in Sleman district, Yogyakarta who were selected using purposive sampling techniques, which totaled 126 students. The procedure used in this study was carried out by examining data obtained from various sources. Data is displayed, categorized, described, then analyzed to obtain conclusions. Data collection in this study used semi-structured observation, semi-structured interviews, and document analysis. The document analysis used in this study utilizes various references to journal articles related to students' collaboration skills to validate research results from observation data and semi-

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structured interviews. The data was analyzed using a model[18], namely data reduction, data display, and conclusion drawing/verification.

RESULTS AND DISCUSSION

Based on the results of semi-structured observations, semi-structured interviews, and document analysis that have been carried out at SDN Caturtunggal 3, SDN Caturtunggal 4, and SDN Babarsari in Sleman district from August to September 2023, several results were found related to students' collaboration skills in science learning. The data obtained is reduced in a more structured form to obtain systematic results. Data from observations are presented in the form of tables, data from interviews are presented after tables, and followed by data from document analysis afterwards. The results of these findings are presented in table 1 about the aspects analyzed on students' collaboration skills in science learning.

Table 1. Students' Collaboration Skills Condition

No	Aspects of Collaboration Skills	Initial Condition of Students	Indications of Possible Causes
1	Actively contribute	It was found that most students tend to be passive and reluctant to give ideas or opinions in group discussions on science learning. Active participation is only dominant in certain students. About more than 60% of students in each class play and do activities that are not related to learning.	Students feel less confident in speaking, afraid of the wrong idea, or don't understand the assignment given. So that only one or two of the group members complete all the group work, while the rest do not actively participate.
2	Work productively	The results of group work in science learning were monitored low and not optimal. Time allotted to group tasks is spent mostly on non-productive activities such as	Students have not been able to divide tasks effectively and efficiently. A lack of understanding of the purpose of the task makes

[18] Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis-third edition*. Sage Publication Ltd.

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No	Aspects of Collaboration Skills	Initial Condition of Students	Indications of Possible Causes
		chatting and playing.	them not focus on completing the work.
3	Responsible	The condition of individual responsibility in carrying out group tasks is still not optimal. This is characterized by the tendency of students who do not complete parts of their assignments and delegate them to other group members who are considered more competent. This has an impact on the process of completing tasks that do not match the timeline, so that tasks are collected not on time.	Students consider group assignments as a burden that can be completed by other friends. They do not yet understand that the success of the group depends on the contribution of each individual.
4	Demonstrates flexibility	Students' skills in showing flexibility are still limited. This can be seen from the tendency of students who do not receive input or criticism from fellow group members, as well as difficulty adapting to changes in group plans. It was also found that students were reluctant to group and compromise with certain people, which is one of the signs of the lack of flexibility of the individual.	Students are not familiar with the concept of deliberation and consensus. They have less tolerance for differing views, which hinders the achievement of agreement.
5	An appreciative attitude	In group activities, it was also found that group members ignored and demeaned the	Lack of empathy and awareness of the importance of mutual

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No	Aspects of Collaboration Skills	Initial Condition of Students	Indications of Possible Causes
		ideas of other members. This indicates that students are not used to appreciating the contributions of each individual. In addition, during the presentation of group results, many students from other groups were busy alone and did not pay attention to the presentation from their friends in front of the class.	respect. The classroom environment has not fully supported a culture in which every idea, no matter how small, is valued.

The results of the interview explained that collaboration skills are still minimal. This was conveyed by the teacher because in the process of learning science in groups, not all group members work together to complete their assignments. The results of the study were also found that it was indicated that students tended to be passive in developing movements and scripts in a performing arts class which had implications for a learning environment that did not optimally encourage active collaboration among students.[19] The low collaboration skills of students were also found from the results of the research[20], due to the lack of interaction between students and group members during discussion activities. Students delegate the responsibility of completing tasks to other members of the group. The same is observed in group activities that are not actively involved in discussions, lack of cooperation and responsibility in tasks, and lack of respect for friends in group presentation activities[21]. Another study

[19] Hsia, L. H., Lin, Y. N., & Hwang, G. J. (2021). A creative problem solving-based flipped learning strategy for promoting students' performing creativity, skills and tendencies of creative thinking and collaboration. *British Journal of Educational Technology*, *52*(4), 1771–1787. https://doi.org/10.1111/bjet.13073

[20] Putri, A. A., & Qosyim, A. (2021). Validitas perangkat pembelajaran saintifik 5m untuk meningkatkan keterampilan kolaborasi dan hasil belajar siswa SMP pada materi sistem pernapasan. *Pensa E-Jurnal: Pendidikan Sains*, *9*(1), 7–16. https://ejournal.unesa.ac.id/index.php/pensa/article/view/38484

[21] Ahwan, M. T. R., & Basuki, S. (2023). Meningkatkan keterampilan kolaborasi siswa melalui aktivitas kebugaran jasmani menggunakan model project based learning (PjBL) SMA Negeri 3

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concluded that students' collaboration skills were in the less collaborative category with a student collaboration score of 39%.[22] This is also supported by the discovery of group conditions in the learning process that have not gone well.[23]

This exposure reinforces that the condition of students' collaboration skills contradicts research[24] which explains that collaboration skills are very important skills to face future challenges in the world of work and education, so an education system that can develop these skills is needed. The reality is that today's learners often lack the skills necessary to collaborate and work in teams in completing tasks that require problem-solving.[25] If this phenomenon continues, the quality of human resources will decline, which can cause society to be filled with less competent graduates. Collaboration skills are needed to create competitive and efficient graduates.[26] In order to anticipate this, a more in-depth analysis is needed related to factors that are indicated to have an influence on improving students' collaboration skills.

The results of the teacher's interview explained that one of the indications of the lack of students' collaboration skills occurred was due to the lack of division of tasks to each group member. During the observation of learning, the researcher observed that all groups had not discussed the division of group work, so that the group members did not understand the jobdesk that had to be done in completing the task. The resource person also emphasized that another cause that

Banjarbaru. *Jurnal Pendidikan Kesehatan Rekreasi*, *9*(1), 106–119. https://doi.org/https://doi.org/10.5281/zenodo.7592832

[22] Sarifah, F., & Nurita, T. (2023). Implementasi model pembelajaran inkuiri terbimbing untuk meningkatkan keterampilan berpikir kritis dan kolaborasi. *Pendidikan Sains*, *11*(1), 22–31. https://doi.org/https://ejournal.unesa.ac.id/index.php/pensa/article/view/46474

[23] Hartina, A. W., Wahyudi, & Permana, I. (2022). Dampak Problem Based Learning Untuk Meningkatkan Keterampilan Kolaborasi dalam Pembelajaran Tematik. *Journal of Education Action Research*, *6*(3), 341–347. https://ejournal.undiksha.ac.id/index.php/JEAR/article/view/49828

[24] Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J. M., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., El Hayek, S., Augereau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D., & Lubart, T. (2023). Creativity, critical thinking, communication, and collaboration: assessment, certification, and promotion of 21st century skills for the future of work and education. *Journal of Intelligence*, *11*(3). https://doi.org/10.3390/jintelligence11030054

[25] Hanum, C. B., Sopandi, W., & Sujana, A. (2023). Students' participation and collaboration skills through radec learning model and the influencing factors. *Mimbar Sekolah Dasar*, *10*(1), 210–225. https://doi.org/10.53400/mimbar-sd.v10i1.55449

[26] Kurniawati, W., Umardianti, U., Novitasari, R. K., & Al Husna, A. (2024). Differentiated science student worksheets : what is the level of collaboration skills of students of the elementary school teacher education study program? *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *10*(2), 627. https://doi.org/10.33394/jk.v10i2.11279

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indicates affecting students' collaboration skills is the lack of learning tools or guidelines that are able to meet the needs of students in improving students' collaboration skills.

Students' collaboration skills do not arise by themselves, the process of improvement is influenced by several factors. The use of student worksheets in STEM-based science learning (science, technology, engineering, and mathematics) is able to encourage students to collaborate and work together in teams to solve real problems.[27] The use of electronic student worksheets has a positive influence on improving students' collaboration skills.[28] Science learning using student worksheets is able to develop students' collaboration skills.[29] Worksheet innovations can be integrated with scripts based on collaborative learning, so that learning is right on target on students' collaboration skills.[30] In addition, worksheets can also be combined with Problem-Based Learning[31] as well as PhET-assisted inquiry-based worksheets to improve students' collaboration skills.[32]

The description above emphasizes that collaboration skills can be improved by using learning guideline media in the form of worksheets intended for students to guide learning activities in the classroom. Worksheets can also be innovated by integrating them with various strategies, such as STEM approaches, electronic, collaborative script-based, PBL models, and so on. In addition to worksheets, another factor that can improve students' collaboration skills is the

[27] Mawaddah, R., Triwoelandari, R., & Irfani, F. (2022). Kelayakan LKS pembelajaran IPA berbasis STEM untuk meningkatkan keterampilan kolaborasi siswa SD/MI. *Jurnal Cakrawala Pendas*, *8*(1), 1–14. https://doi.org/http://dx.doi.org/10.31949/jcp.v6i1.3338 p-ISSN:

[28] Felitasari, A., & Rusmini, R. (2022). Development of E-worksheet assisted by liveworksheets to improve science process skills and collaboration on chemical equilibrium materials. *Scientiae Educatia*, *11*(1), 10. https://doi.org/10.24235/sc.educatia.v11i1.10235

[29] Anggrahini, A., & Rusmini, R. (2022). Improving science process skills and collaboration on the lesson reaction rate using electronic student worksheet assisted with liveworksheets website. *Journal of The Indonesian Society of Integrated Chemistry*, *14*(1), 28–43. https://doi.org/10.22437/jisic.v14i1.17859

[30] Dwipoyanti, N. A., Supeno, S., & Nuha, U. (2024). Development of collaboration script-based worksheets to improve collaborative skills and learning outcomes in junior high schools science learning. *Jurnal Ilmu Pendidikan (JIP) STKIP Kusuma Negara*, *15*(2), 209–222. https://doi.org/10.37640/jip.v15i2.1818

[31] Wijaya, T. P., Mundilarto, & Wilujeng, I. (2024). Development of problem-based learning collaborative (PBL-C) physics e-worksheet to improve student problem solving and collaboration skills. *Jurnal Penelitian Pendidikan IPA*, *10*(1), 47–54. https://doi.org/10.29303/jppipa.v10i1.5284

[32] Rahayu, T., & Wibowo, W. S. (2023). The development of phet-assisted inquiry-based electronic worksheets to improve communication and collaboration skills. *Jurnal Penelitian Pendidikan IPA*, *8*(1), 27–34. https://doi.org/10.26740/jppipa.v8n1.p27-34

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learning process that is tailored to the needs of students. This is in accordance with the results of research[33] that collaboration skills can be improved by learning that forms diverse groups, both based on students' abilities, interests, and learning profiles. Learning that pays attention to students' abilities and learning styles is one of the factors that affect students' understanding of science concepts.[34] Assigning assignments or projects that are relevant to students' interests and levels of understanding in a differentiated learning framework can encourage students to be more motivated to actively contribute in groups.[35] School facilities in the form of learning resources and learning environments as well as students' enthusiasm in differentiated learning make a positive contribution to students' collaboration skills.[36] Based on this presentation, further research is needed related to the development of learning guideline media innovations in the form of worksheets that are tailored to the needs of students.

CONCLUSION

This study found that the collaboration skills of grade IV elementary school students in science learning are still relatively low. The lack of collaboration skills of students is indicated because students tend to be passive and do not actively contribute to group activities. Group assignments are often only done by a few dominant students. Learners delegate task responsibilities to one or two group members who are deemed competent to complete. So that it has an impact on the productivity of the work presented by the group. During the presentation, students do not appreciate the group in charge of presenting in front of the class, making the atmosphere unconducive and affecting the concentration of other students.

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[33] Musni, D. I., & Antrakusuma, B. (2024). Improving collaboration skills through the implementation of differentiated learning with a discovery learning model in junior high schools Article History. *Innovations in Science Education and Practice*, *1*(1), 18–24. https://doi.org/10.20961/isep.v1i1.1746

[34] Umardianti, U., Supartinah, & Kurniawati, W. (2023). Does educational background affect understanding of science concepts ? case study of prospective elementary school teachers. *Jurnal Penelitian Pendidikan IPA*, *9*(8), 5798–5805. https://doi.org/10.29303/jppipa.v9i8.3584

[35] Sopacua, F. (2025). The implementation of a differentiated approach to improve collaboration skills in physics material. *Journal of Science and Science Education*, *6*(1), 18–23. https://doi.org/10.29303/jossed.v6i1.10965

[36] Ramli, & Lova, S. N. (2025). Enhancing collaborative skills in elementary school : a differentiated learning focus. *Jurnal Strategi Pembelajaran*, *2*(1), 38–44. https://ccg-edu.org/index.php/jsp/article/view/351/211

TADBIR: Jurnal Manajemen Pendidikan Islam
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The condition of students' low collaboration skills is influenced by the absence of division of tasks to each group member because there is no learning guideline media that is able to meet the needs of students in improving students' collaboration skills. Collaboration skills can be improved by implementing learning that integrates learner worksheets and learning strategies tailored to learners' needs. The results of this study have implications for the need for innovation in the development of student worksheets that are integrated with differentiated learning to improve students' collaboration skills.

BIBLIOGRAPHY

Afdilla, A. N., Rednoningsih, T., & Sukaesih, S. (2024). Peningkatan keterampilan kolaborasi melalui model discovery learning pada pembelajaran IPA kelas VIII B SMP Negeri 4 Semarang. *Seminar Nasional Pendidikan Dan Penelitian Tindakan Kelas*, 99–111. https://proceeding.unnes.ac.id/snpptk/article/view/3134

Ahwan, M. T. R., & Basuki, S. (2023). Meningkatkan keterampilan kolaborasi siswa melalui aktivitas kebugaran jasmani menggunakan model project based learning (PJBl) SMA Negeri 3 Banjarbaru. *Jurnal Pendidikan Kesehatan Rekreasi*, *9*(1), 106–119. https://doi.org/https://doi.org/10.5281/zenodo.7592832

Alimah, S., & Utami, L. (2019). Human reproduction contextual case-based worksheet to improve students' interpersonal communication and collaboration skills. *Biosaintifika: Journal of Biology & Biology Education*, *11*(2), 256–263. https://doi.org/10.15294/biosaintifika.v11i2.19760

Anggrahini, A., & Rusmini, R. (2022). Improving science process skills and collaboration on the lesson reaction rate using electronic student worksheet assisted with liveworksheets website. *Journal of The Indonesian Society of Integrated Chemistry*, *14*(1), 28–43. https://doi.org/10.22437/jisic.v14i1.17859

Dwipoyanti, N. A., Supeno, S., & Nuha, U. (2024). Development of collaboration script-based worksheets to improve collaborative skills and learning outcomes in junior high schools science learning. *Jurnal Ilmu Pendidikan (JIP) STKIP Kusuma Negara*, *15*(2), 209–222. https://doi.org/10.37640/jip.v15i2.1818

Fadhlurrohman, M. T., & Wardhany, Z. (2024). Pengaruh budaya kolaboratif dan lingkungan kerja yang kondusif terhadap kinerja karyawan IT di organisasi BRIN. *Jurnal Manajemen Bisnis Era Digital*, *1*(2), 204–216. https://doi.org/10.61132/jumabedi.v1i2.116

TADBIR: Jurnal Manajemen Pendidikan Islam
P-ISSN: 2338:6673; E:ISSN 2442:8280
Vol. 13. No. 03. Oktober, 2025, Hal: 505-519

Felitasari, A., & Rusmini, R. (2022). Development of E-Worksheet Assisted by Liveworksheets to Improve Science Process Skills and Collaboration on Chemical Equilibrium Materials. *Scientiae Educatia*, *11*(1), 10. https://doi.org/10.24235/sc.educatia.v11i1.10235

Greenstein, L. (2012). *Assessing 21st century skills: A guide to evaluating mastery and authentic learning*. California: Corwin.

Gusta, W., Christina, D., & Zakirman. (2020). Improved student collaboration skills on english learning using jigsaw models. *International Journal of Scientific and Technology Research*, *9*(3), 1051–1056. http://repository.upiyptk.ac.id/3107/

Hanum, C. B., Sopandi, W., & Sujana, A. (2023). Students' Participation and Collaboration Skills through RADEC Learning Model and the Influencing Factors. *Mimbar Sekolah Dasar*, *10*(1), 210–225. https://doi.org/10.53400/mimbar-sd.v10i1.55449

Hartina, A. W., Wahyudi, & Permana, I. (2022). Dampak Problem Based Learning Untuk Meningkatkan Keterampilan Kolaborasi dalam Pembelajaran Tematik. *Journal of Education Action Research*, *6*(3), 341–347. https://ejournal.undiksha.ac.id/index.php/JEAR/article/view/49828

Hoang, D. T. N., & Hoang, T. (2024). Enhancing EFL students' academic writing skills in online learning via Google Docs-based collaboration: a mixed-methods study. *Computer Assisted Language Learning*, *37*(7), 1504–1526. https://doi.org/10.1080/09588221.2022.2083176

Hsia, L. H., Lin, Y. N., & Hwang, G. J. (2021). A creative problem solving-based flipped learning strategy for promoting students' performing creativity, skills and tendencies of creative thinking and collaboration. *British Journal of Educational Technology*, *52*(4), 1771–1787. https://doi.org/10.1111/bjet.13073

Junita, J., & Wardani, K. W. (2020). Efektivitas model pembelajaran STAD dan CIRC terhadap peningkatan keterampilan kolaborasi siswa kelas V SD Gugus Joko Tingkir pada mata pelajaran tematik. *JPDI (Jurnal Pendidikan Dasar Indonesia)*, *5*(1), 11–17. https://doi.org/10.26737/jpdi.v5i1.1688

Kurniawati, W., Umardianti, U., Novitasari, R. K., & Al Husna, A. (2024). Differentiated Science Student Worksheets : What is the Level of Collaboration Skills of Students of the Elementary School Teacher Education Study Program? *Jurnal Kependidikan: Jurnal Hasil Penelitian Dan Kajian Kepustakaan Di Bidang Pendidikan, Pengajaran Dan Pembelajaran*, *10*(2), 627. https://doi.org/10.33394/jk.v10i2.11279

Li, J., & Mak, L. (2022). The effects of using an online collaboration tool on college students' learning of academic writing skills. *System*, *105*(March 2021), 1–14. https://doi.org/10.1016/j.system.2021.102712

TADBIR: Jurnal Manajemen Pendidikan Islam
P-ISSN: 2338:6673; E:ISSN 2442:8280
Vol. 13. No. 03. Oktober, 2025, Hal: 505-519

Mantau, B. A. K., & Talango, S. R. (2023). Pengintegrasian Keterampilan Abad 21 Dalam Proses Pembelajaran (Literature Review). *Irfani*, *19*(1), 86–107. https://doi.org/10.30603/ir.v19i1.3897

Mawaddah, R., Triwoelandari, R., & Irfani, F. (2022). Kelayakan LKS pembelajaran IPA berbasis STEM untuk meningkatkan keterampilan kolaborasi siswa SD/MI. *Jurnal Cakrawala Pendas*, *8*(1), 1–14. https://doi.org/http://dx.doi.org/10.31949/jcp.v6i1.3338 p-ISSN:

Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative Data Analysis-Third Edition*. Sage Publication Ltd.

Musni, D. I., & Antrakusuma, B. (2024). Improving collaboration skills through the implementation of differentiated learning with a discovery learning model in junior high schools Article History. *Innovations in Science Education and Practice*, *1*(1), 18–24. https://doi.org/10.20961/isep.v1i1.1746

Nurwahidah, N., Samsuri, T., Mirawati, B., & Indriati, I. (2021). Meningkatkan keterampilan kolaborasi siswa menggunakan lembar kerja siswa berbasis saintifik. *Reflection Journal*, *1*(2), 70–76. https://doi.org/10.36312/rj.v1i2.556

Putri, A. A., & Qosyim, A. (2021). Validitas Perangkat Pembelajaran Saintifik 5M untuk Meningkatkan Keterampilan Kolaborasi dan Hasil Belajar Siswa SMP pada Materi Sistem Pernapasan. *Pensa E-Jurnal: Pendidikan Sains*, *9*(1), 7–16. https://ejournal.unesa.ac.id/index.php/pensa/article/view/38484

Rahayu, T., & Wibowo, W. S. (2023). The development of PhET-assisted inquiry-based electronic worksheets to improve communication and collaboration skills. *Jurnal Penelitian Pendidikan IPA*, *8*(1), 27–34. https://doi.org/10.26740/jppipa.v8n1.p27-34

Ramli, & Lova, S. N. (2025). Enhancing collaborative skills in elementary school : a differentiated learning focus. *Jurnal Strategi Pembelajaran*, *2*(1), 38–44. https://ccg-edu.org/index.php/jsp/article/view/351/211

Santoso, A. M., Primandiri, P. R., Zubaidah, S., & Amin, M. (2021). Improving student collaboration and critical thinking skills through ASICC model learning. *Journal of Physics: Conference Series*, *1806*(1). https://doi.org/10.1088/1742-6596/1806/1/012174

Sarifah, F., & Nurita, T. (2023). Implementasi model pembelajaran inkuiri terbimbing untuk meningkatkan keterampilan berpikir kritis dan kolaborasi. *Pendidikan Sains*, *11*(1), 22–31. https://doi.org/https://ejournal.unesa.ac.id/index.php/pensa/article/view/46474

Sopacua, F. (2025). The Implementation of a Differentiated Approach to Improve Collaboration Skills in Physics Material. *Journal of Science and Science Education*, *6*(1), 18–23. https://doi.org/10.29303/jossed.v6i1.10965

TADBIR: Jurnal Manajemen Pendidikan Islam
P-ISSN: 2338:6673; E:ISSN 2442:8280
Vol. 13. No. 03. Oktober, 2025, Hal: 505-519

Supratman. (2021). Kolaborasi dalam komunikasi kelompok menurut teori strukturasi anthony gidden. *Intelektiva*, *03*(04), 156–164. https://www.jurnalintelektiva.com/index.php/jurnal/article/download/675/511

Thornhill-Miller, B., Camarda, A., Mercier, M., Burkhardt, J. M., Morisseau, T., Bourgeois-Bougrine, S., Vinchon, F., El Hayek, S., Augereau-Landais, M., Mourey, F., Feybesse, C., Sundquist, D., & Lubart, T. (2023). Creativity, Critical Thinking, Communication, and Collaboration: Assessment, Certification, and Promotion of 21st Century Skills for the Future of Work and Education. *Journal of Intelligence*, *11*(3). https://doi.org/10.3390/jintelligence11030054

Ulhusna, M., Putri, S. D., & Zakirman, Z. (2020). Permainan Ludo untuk meningkatkan keterampilan kolaborasi siswa dalam pembelajaran matematika. *International Journal of Elementary Education*, *4*(2), 130. https://doi.org/10.23887/ijee.v4i2.23050

Umardianti, U., Supartinah, & Kurniawati, W. (2023). Does Educational Background Affect Understanding of Science Concepts ? Case Study of Prospective Elementary School Teachers. *Jurnal Penelitian Pendidikan IPA*, *9*(8), 5798–5805. https://doi.org/10.29303/jppipa.v9i8.3584

Wahyuni, M. T., Rodhiah, R. T. A., & Fahillah, M. (2025). Strategi Peningkatan Keterampilan Abad ke-21 Siswa SD dengan Memanfaatkan Aliran Filsafat Rekonstruksionisme. *JEMARI (Jurnal Edukasi Madrasah Ibtidaiyah)*, *7*(2), 88–103. https://doi.org/10.30599/0cbvwb74

Wijaya, T. P., Mundilarto, & Wilujeng, I. (2024). Development of Problem Based Learning Collaborative (PBL-C) Physics E-Worksheet to Improve Student Problem Solving and Collaboration Skills. *Jurnal Penelitian Pendidikan IPA*, *10*(1), 47–54. https://doi.org/10.29303/jppipa.v10i1.5284