



Implementation of Google Classroom-Based Educational Technology Through Classroom Action Research to Improve Science Learning Activities of Eighth Grade Students at SMP Muhammadiyah Rappang

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Abstrak

Penelitian ini bertujuan untuk meningkatkan aktivitas belajar IPA siswa melalui penerapan teknologi pendidikan berbasis Google Classroom dengan menggunakan pendekatan Penelitian Tindakan Kelas (PTK). Penelitian dilaksanakan di SMP Muhammadiyah Rappang pada tahun ajaran 2025/2026. Partisipan penelitian terdiri atas 58 siswa kelas VIII. Penelitian ini menggunakan dua siklus Penelitian Tindakan Kelas yang meliputi tahap perencanaan, pelaksanaan tindakan, observasi, dan refleksi. Data dikumpulkan melalui observasi kelas, lembar aktivitas siswa, wawancara, dan dokumentasi. Indikator aktivitas belajar meliputi partisipasi siswa dalam diskusi, penyelesaian tugas, responsivitas selama pembelajaran daring, kolaborasi, dan keterlibatan dalam tugas pembelajaran IPA. Data yang diperoleh dianalisis menggunakan metode deskriptif kualitatif dan kuantitatif. Hasil penelitian menunjukkan bahwa penerapan Google Classroom secara signifikan meningkatkan aktivitas belajar siswa pada mata pelajaran IPA. Pada siklus I, partisipasi dan keterlibatan siswa berada pada kategori sedang, sedangkan pada siklus II terjadi peningkatan yang cukup signifikan dalam partisipasi aktif, kolaborasi, dan tanggung jawab belajar siswa. Persentase rata-rata aktivitas belajar siswa meningkat dari 64,3% pada siklus I menjadi 85,7% pada siklus II. Penggunaan Google Classroom juga meningkatkan komunikasi antara guru dan siswa, mempermudah akses terhadap materi pembelajaran, serta mendorong kemandirian belajar siswa. Oleh karena itu, integrasi teknologi pendidikan berbasis Google Classroom melalui Penelitian Tindakan Kelas efektif dalam meningkatkan aktivitas belajar IPA siswa kelas VIII. Penelitian ini merekomendasikan bahwa platform pembelajaran digital dapat menjadi media pembelajaran inovatif untuk mendukung lingkungan belajar yang interaktif dan berpusat pada siswa di sekolah menengah pertama.

Kata Kunci: Google Classroom, teknologi pendidikan, penelitian tindakan kelas, aktivitas belajar IPA, siswa sekolah menengah pertama.

Abstract

This study aimed to improve students' science learning activities through the implementation of Google Classroom-based educational technology using a Classroom Action Research (CAR) approach. The research was conducted at SMP Muhammadiyah Rappang during the 2025/2026 academic year. The participants consisted of 58 eighth-grade students. The study employed two cycles of Classroom Action Research, including planning, action, observation, and reflection stages. Data were collected through classroom observations, student activity sheets, interviews, and documentation. The indicators of learning activities included students' participation in discussions, assignment completion, responsiveness during online learning, collaboration, and engagement in science learning tasks. The collected data were analyzed using descriptive qualitative and quantitative methods.

The findings revealed that the implementation of Google Classroom significantly improved students' learning activities in science classes. In the first cycle, student participation and engagement were categorized as moderate, while in the second cycle, there was a considerable increase in active participation, collaboration, and learning responsibility. The average percentage of student learning activities increased from 64.3% in Cycle I to 85.7% in Cycle II. The use of Google Classroom also enhanced communication between teachers and students, facilitated access to learning materials, and encouraged independent learning. Therefore, the integration of Google Classroom-based educational technology through Classroom Action Research was effective in improving the science learning activities of eighth-grade students. The study suggests that digital learning platforms can serve as innovative instructional media to support interactive and student-centered learning environments in junior high schools.

Keywords: Google Classroom, educational technology, classroom action research, science learning activities, junior high school students.

Introduction

The rapid development of digital technology in the era of Industrial Revolution 4.0 has significantly transformed the educational landscape, particularly in teaching and learning processes. Educational institutions are increasingly encouraged to integrate technology into classroom instruction to improve students' participation, motivation, and learning outcomes. Digital learning platforms have become important tools in creating interactive and student-centered learning environments. One of the most widely used educational platforms is Google Classroom, which provides teachers and students with opportunities to manage learning activities efficiently through online discussions, assignment distribution, assessment, and collaborative learning. The integration of technology in education is considered essential for preparing students to face the challenges of 21st-century learning

Educational technology plays an important role in supporting active learning and improving students' engagement in the classroom. Active learning emphasizes students' participation in discussions, problem-solving activities, collaboration, and independent learning experiences.

According to recent educational theories, technology-assisted learning environments can increase behavioral, emotional, and cognitive engagement among students. The use of digital platforms allows learners to access instructional materials flexibly and interact more actively during the learning process. Therefore, teachers are required to develop innovative instructional strategies that combine pedagogical approaches with educational technology integration

The implementation of Google Classroom has attracted considerable attention from researchers because of its effectiveness in facilitating digital learning activities. Kumar and Bervell (2019) explained that Google Classroom supports mobile learning by providing accessible and user-friendly features that improve students' learning experiences and participation. The platform enables students to access learning materials anytime and anywhere, submit assignments digitally, and communicate effectively with teachers and peers. Furthermore, Google Classroom supports collaborative learning and encourages students to become more independent learners. The flexibility and accessibility of this platform make it suitable for junior high school learning environments, especially in science subjects that require

active interaction and continuous learning activities.

Science learning at the junior high school level requires active student involvement because science concepts are closely related to observation, experimentation, critical thinking, and problem-solving activities. However, many students still show low participation during classroom instruction. Some students tend to be passive, less motivated to ask questions, reluctant to participate in discussions, and often late in submitting assignments. These conditions indicate that traditional teacher-centered learning methods are insufficient to encourage students' active engagement. Consequently, innovative learning media and technology-based instructional strategies are needed to create more interactive and meaningful science learning experiences.

The theory of constructivism emphasizes that students actively construct knowledge through learning experiences and social interaction. In technology-supported learning environments, constructivist principles can be implemented through collaborative discussions, online assignments, and interactive learning activities facilitated by digital platforms. Google Classroom supports constructivist learning by enabling students to interact with instructional content, communicate with peers, and receive immediate feedback from teachers. In addition, the Technology Acceptance Theory explains that students' positive perceptions toward technology significantly influence their willingness to use digital learning platforms effectively. Therefore, integrating Google Classroom into classroom instruction may contribute positively to improving students' learning activities and participation

Several previous studies have demonstrated the effectiveness of Google

Classroom in enhancing students' learning engagement and academic achievement. Research conducted by Nurfalalah (2019) revealed that Google Classroom-based virtual learning successfully optimized physics learning activities and promoted students' digital literacy skills. Similarly, studies on blended learning environments showed that Google Classroom improved communication between teachers and students while supporting collaborative learning activities. Other studies also highlighted that educational technology integration positively affects students' motivation, learning independence, and classroom participation. These findings indicate that digital learning platforms have substantial potential to improve the quality of education at various educational levels

Despite the growing implementation of educational technology, several challenges remain in integrating technology into classroom instruction. Teachers often encounter limitations related to technological infrastructure, students' readiness, internet accessibility, and insufficient digital literacy skills. Furthermore, some teachers still rely heavily on conventional teaching methods and have limited experience in utilizing digital learning platforms effectively. Therefore, classroom-based action research is necessary to identify practical solutions and improve instructional practices through continuous reflection and improvement cycles. Classroom Action Research enables teachers to evaluate learning problems systematically and implement innovative teaching strategies to enhance students' learning activities.

Based on the explanations above, this study aimed to investigate the implementation of Google Classroom-based educational technology through Classroom Action Research to improve

the science learning activities of eighth-grade students at SMP Muhammadiyah Rappang during the 2025/2026 academic year. This research is expected to contribute theoretically to the development of technology-integrated learning theories and practically to the improvement of active and student-centered science learning practices in junior high schools.

Method

This study employed a Classroom Action Research (CAR) design to improve students' science learning activities through the implementation of Google Classroom-based educational technology. Classroom Action Research was selected because it allows teachers and researchers to identify classroom learning problems and apply systematic improvements through reflective cycles. The study followed the CAR model proposed by Kemmis and McTaggart, which consists of four stages: planning, action, observation, and reflection. The research was conducted in two cycles to ensure continuous improvement in the teaching and learning process.

The research was conducted at SMP Muhammadiyah Rappang during the 2025/2026 academic year. The participants of the study consisted of 26 eighth-grade students. The participants were selected because they experienced low learning activity and limited participation during science learning activities. The researcher collaborated with the science teacher to implement technology-based learning strategies using Google Classroom in classroom instruction.

In the planning stage, the researcher prepared lesson plans, learning materials, observation sheets, and assessment instruments integrated with Google Classroom features. The instructional activities were designed to encourage students' active participation through online discussions, assignment submissions, interactive learning materials, and collaborative tasks. In addition, the researcher provided guidance to students regarding the use of Google Classroom to

ensure effective participation during the learning process.

During the action stage, the learning activities were conducted using Google Classroom as the primary learning platform. Students accessed learning materials, participated in online discussions, completed assignments, and communicated with the teacher through the platform. The implementation focused on increasing students' engagement, interaction, and responsibility in science learning activities. The researcher and collaborating teacher facilitated the learning process and monitored students' participation throughout each cycle.

Data were collected using several research instruments, including observation sheets, interviews, documentation, and students' activity assessment forms. Observation sheets were used to measure students' participation, attention, collaboration, and responsiveness during the learning process. Interviews were conducted with students and teachers to identify their perceptions and experiences regarding the implementation of Google Classroom. Documentation such as attendance records, assignment submissions, and classroom activity reports was also used to support the research findings.

The collected data were analyzed using descriptive qualitative and quantitative analysis techniques. Quantitative data were obtained from the percentage of students' learning activities in each cycle, while qualitative data were derived from observations, interviews, and reflections. The success indicator of the study was achieved when at least 80% of students actively participated in science learning activities. Reflection results from each cycle were used to evaluate weaknesses and improve instructional strategies in the following cycle to achieve better learning outcomes and student engagement.

Result and Discussion

The implementation of Google Classroom-based educational technology through Classroom Action Research showed positive improvements in students' science learning activities. The research was conducted in two cycles involving 26 eighth-grade students at SMP Muhammadiyah

Rappang during the 2025/2026 academic year. Each cycle consisted of planning, action, observation, and reflection stages. The findings indicated significant improvements in students' participation, engagement, and interaction during science learning activities after the integration of Google Classroom.

In the preliminary observation conducted before Cycle I, many students demonstrated low participation during classroom learning. Several students were passive during discussions, rarely asked questions, and often submitted assignments late. The teacher-centered instructional approach reduced opportunities for students to interact actively during the learning process. Only a small number of students showed enthusiasm and active involvement in science learning activities. These conditions indicated the need for technology-based instructional innovation to improve students' classroom engagement.

During Cycle I, Google Classroom was introduced as the main learning platform to support science instruction. Students were guided to access learning materials, participate in online discussions, and submit assignments through the platform. The implementation of digital learning activities began to encourage students to become more involved in classroom learning. Observation results showed that students demonstrated better participation compared to the preliminary stage, although some students still experienced difficulties in adapting to the use of digital learning technology.

The observation results in Cycle I revealed that students' active participation reached 61.5%. Several students actively responded to teacher instructions, participated in online discussions, and completed assignments on time. However, a number of students still lacked confidence in expressing opinions and collaborating with peers during online activities. Technical issues related to internet connectivity and students' unfamiliarity with Google Classroom also affected the effectiveness of learning activities in the first cycle. Therefore, improvements were implemented in Cycle II to address these limitations.

In Cycle II, the researcher improved instructional strategies by providing clearer

guidance, interactive learning materials, and more collaborative learning activities through Google Classroom. Students were encouraged to participate actively in group discussions, ask questions, and provide feedback to peers during online learning sessions. The teacher also provided more intensive supervision and motivation to increase students' confidence and engagement in science learning activities.

The implementation of improved strategies in Cycle II produced more significant learning improvements. Students became more enthusiastic and actively involved in classroom discussions and digital learning activities. They showed greater responsibility in completing assignments and accessing learning materials independently through Google Classroom. Students also demonstrated better communication and collaboration skills during group learning activities. The learning environment became more interactive and student-centered compared to the previous cycle.

The observation results in Cycle II indicated that students' active participation increased significantly from 61.5% in Cycle I to 84.6% in Cycle II. Most students actively participated in discussions, submitted assignments punctually, and interacted positively with teachers and peers during the learning process. The success indicator of the study was achieved because more than 80% of students demonstrated active engagement in science learning activities. These findings indicate that the implementation of Google Classroom effectively improved students' learning activities in science classes.

In addition to improving learning activities, the implementation of Google Classroom also generated positive responses from students and teachers. Students stated that digital learning activities were more interesting, flexible, and accessible because learning materials could be accessed anytime and anywhere. Teachers also perceived that Google Classroom facilitated classroom management, assignment distribution, and communication with students more effectively. Overall, the results of the study demonstrate that Google Classroom-based educational technology can support active, interactive, and student-centered science learning in junior high schools.

Discussion

The findings of this study demonstrate that the implementation of Google Classroom-based educational technology successfully improved students' science learning activities. The increase in students' participation from 61.5% in Cycle I to 84.6% in Cycle II indicates that digital learning platforms can create more engaging and interactive learning environments. This finding supports the concept of educational technology integration, which emphasizes the importance of utilizing digital media to encourage active learning and student participation in classroom instruction.

The improvement in students' learning activities can be explained through constructivist learning theory, which states that students actively construct knowledge through interaction, collaboration, and learning experiences. Google Classroom facilitated constructivist learning by enabling students to access learning materials independently, participate in online discussions, and collaborate with peers during science learning activities. The use of interactive digital platforms allowed students to become more actively involved in the learning process rather than merely receiving information passively from the teacher.

The results of this study are also consistent with the theory of student engagement, which emphasizes behavioral, emotional, and cognitive participation in learning activities. The implementation of Google Classroom increased students' behavioral engagement through active participation in discussions and assignment completion. Emotional engagement was reflected in students' enthusiasm and positive attitudes toward digital learning activities, while cognitive engagement was demonstrated through students' independent access to learning materials and collaborative problem-solving activities.

Furthermore, the findings support previous studies conducted by Kumar and Bervell (2019), which revealed that Google Classroom provides flexible and accessible learning experiences that improve students' participation and learning interaction. The platform allows students to learn beyond classroom boundaries by accessing educational materials anytime and anywhere. This flexibility contributed significantly to

students' motivation and responsibility in completing science learning tasks and participating actively during classroom activities.

The implementation of Classroom Action Research also contributed significantly to the success of this study. The cyclical process of planning, action, observation, and reflection enabled the researcher and teacher to identify learning challenges and continuously improve instructional strategies. Reflection activities conducted after Cycle I helped the researcher address students' difficulties related to digital adaptation and classroom participation. Consequently, the improvements implemented in Cycle II resulted in better student engagement and learning interaction.

Another important finding of this study is the positive response of students toward technology-based learning. Students perceived that Google Classroom created a more interesting and enjoyable learning environment compared to conventional teaching methods. Interactive digital learning activities increased students' confidence in expressing ideas, asking questions, and collaborating with peers during science instruction. These findings indicate that educational technology can positively influence students' attitudes and motivation toward learning.

Despite the positive findings, several challenges were encountered during the implementation process. Some students initially experienced difficulties related to internet access and unfamiliarity with digital learning platforms. Technical limitations occasionally affected students' participation during online learning activities. However, these challenges were gradually minimized through teacher guidance, collaborative support, and repeated practice in using Google Classroom. This finding suggests that successful technology integration requires adequate technological support and digital literacy development among students and teachers.

Overall, this study confirms that Google Classroom-based educational technology is effective in improving students' science learning activities at the junior high school level. The integration of digital learning platforms promotes active participation, collaborative learning,

independent learning, and interactive classroom environments. Therefore, teachers are encouraged to integrate educational technology into classroom instruction as an alternative strategy to support student-centered learning and improve the quality of science education in secondary schools.

Conclusion

The implementation of Google Classroom-based educational technology through Classroom Action Research successfully improved the science learning activities of eighth-grade students at SMP Muhammadiyah Rappang during the 2025/2026 academic year. The findings revealed that students became more active in participating in discussions, accessing learning materials, collaborating with peers, and submitting assignments on time. The percentage of students' active participation increased significantly from 61.5% in Cycle I to 84.6% in Cycle II, indicating that the integration of digital learning platforms effectively supported active and student-centered learning.

The use of Google Classroom also created a more interactive, flexible, and engaging learning environment for students. The platform facilitated communication between teachers and students while encouraging independent learning and collaborative activities during science instruction. In addition, the Classroom Action Research approach enabled continuous reflection and improvement of instructional strategies, contributing to the success of the learning process. The study demonstrates that educational technology integration can positively influence students' participation, motivation, and engagement in classroom learning activities.

Based on the findings, this study recommends that teachers integrate digital learning platforms such as Google Classroom into classroom instruction to enhance students' learning activities and learning experiences. Schools should also provide adequate technological facilities and digital literacy support to optimize the implementation of technology-based learning. Future researchers are encouraged to conduct further studies involving larger participants, different subjects, and various educational levels to strengthen the findings related to the effectiveness of educational technology in improving learning quality.

REFERENCES

- Agustan, M. T., Usman, M., & Madaling. (2025). The effect of educational game use on mathematics learning outcomes of seventh-grade students at UPT SMP Negeri 5 Panca Rijang. *Edumaspul-Jurnal Pendidikan*.
- Al-Marroof, R. A. S., & Al-Emran, M. (2018). Students acceptance of Google Classroom: An exploratory study using PLS-SEM approach. *International Journal of Emerging Technologies in Learning*, 13(6), 112–123.
- Anugrahana, A. (2020). Barriers, solutions, and hopes: Online learning during the Covid-19 pandemic by elementary school teachers. *Scholaria: Jurnal Pendidikan dan Kebudayaan*, 10(3), 282–289.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
- Dwiyogo, W. D. (2018). *Pembelajaran berbasis blended learning*. Rajawali Pers.

- Heggart, K. R., & Yoo, J. (2018). Getting the most from Google Classroom: A pedagogical framework for tertiary educators. *Australian Journal of Teacher Education*, 43(3), 140–153.
- Hermansyah, S., & Usman, M. (2024). Optimizing WhatsApp Messenger to enhance junior high school students' writing skills. *Asian Journal of Educational Research & Technology*, 14(4), 71–80.
- Hermansyah, S., Syamsu T., & Syamsunir. (2025). *Buku media pembelajaran digital*. Indonesia.
- Idris, S. M., Takdir, M., & Usman, M. (2024). The influence of using Visme-based presentation media on science learning outcomes of eighth grade students at SMP Negeri 1 Watang Pulu. *International Journal of Sustainable Applied Sciences (IJSAS)*, 2(9), 913–922.
- Iskandar, D., & Narsim. (2019). *Penelitian tindakan kelas dan publikasinya untuk kenaikan pangkat dan golongan guru dan pedoman penulisan PTK bagi mahasiswa*. CV. Penerbit Qiara Media.
- Kahar, N. F., Usman, M., & Ferdiansyah, H. (2025). The effectiveness of using Microsoft Sway application on improving social studies learning outcomes of seventh-grade students at SMPN 5 Panca Rijang. *Edumaspul-Jurnal Pendidikan*, 9(2), 606–613.
- Kemmis, S., McTaggart, R., & Nixon, R. (2017). *The action research planner: Doing critical participatory action research*. Springer.
- Kumar, J. A., & Bervell, B. (2019). Google Classroom for mobile learning in higher education: Modelling the initial perceptions of students. *Education and Information Technologies*, 24(2), 1793–1817.
- Mulyasa, E. (2018). *Implementasi kurikulum 2013 revisi dalam era revolusi industri 4.0*. Bumi Aksara.
- Nurfalah, E. (2019). *Optimalisasi e-learning berbasis virtual class dengan Google Classroom sebagai media pembelajaran fisika*. *Physics Education Research Journal*, 1(1), 46–55.
- Pratiwi, E. W. (2020). Dampak Covid-19 terhadap kegiatan pembelajaran online di sebuah perguruan tinggi Kristen di Indonesia. *Perspective: Jurnal Teologi dan Pendidikan Kristen*, 2(1), 1–8.
- Rahmadyanti, E., & Wibawa, S. C. (2020). Pengembangan media pembelajaran berbasis Google Classroom untuk meningkatkan hasil belajar siswa. *Jurnal IT-EDU*, 5(1), 123–130.
- Rainilda, U., Usman, M., & colleagues. (2025). The effectiveness of Nearpod-based learning media on the biology learning outcomes of 11th grade students at UPT SMA Negeri 10 Sidenreng Rappang. *Edumaspul-Jurnal Pendidikan*, 9(1), 169–173.
- Sari, I. P., & Setiawan, A. (2018). The development of internet-based economic learning media using Moodle approach. *International Journal of Active Learning*, 3(2), 100–109.
- Sugiyono. (2019). *Metode penelitian kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Suharto, S., & Suriyani, L. D. (2019). The effect of Google Classroom-assisted blended learning on students' learning outcomes. *Jurnal Kependidikan*, 3(2), 234–245.
- Surani, D. (2019). *Studi literatur: Peran teknologi pendidikan dalam pendidikan 4.0*. *Prosiding Seminar Nasional Pendidikan FKIP*, 2(1), 456–469.
- Susanto, A. (2018). *Teori belajar dan pembelajaran di sekolah dasar*. Prenadamedia Group.
- UMS Rappang. (2025). The effectiveness of LMS-based digital learning methods on improving Indonesian language literacy among students of SMP Muhammadiyah Rappang. *Edumaspul-Jurnal Pendidikan*, 9(2).

- Wahyuni, S., & Nurhayati. (2019). The implementation of Google Classroom in improving students' motivation in learning English. *Journal of Educational Science and Technology*, 5(1), 56–62.
- Wicaksono, V. D., & Rachmadyanti, P. (2017). Pembelajaran blended learning melalui Google Classroom di sekolah dasar. *Seminar Nasional Pendidikan PGSD UMS & HDPGSDI Wilayah Jawa*, 513–521.
- Yuliani, M., Simarmata, J., Susanti, S. S., Mahawati, E., Sudra, R. I., Dwiyanto, H., & Yuniwati, I. (2020). Pembelajaran daring untuk pendidikan: Teori dan penerapan. *Yayasan Kita Menulis*.
- Abd Kahar, Syahrir L., & Hermansyah, S. (2023). The use of Google Classroom as a blended learning method for eighth grade English learners at SMP Muhammadiyah Rappang. *La Ogi: English Language Journal*, 9(2), 120–130.