

## UTILIZATION OF POWERPOINT MEDIA TO IMPROVE STUDENT LEARNING OUTCOMES

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Received: 06/02/2026

Revised: 11/02/2026

Accepted: 08/03/2026

**Abstract:** This community service aims to improve students' learning outcomes using technology-based learning media, particularly interactive Microsoft PowerPoint, in Biology learning for twelfth-grade students at SMA Adhyaksa Ende. The study was motivated by low student achievement caused by the dominance of teacher-centred lecture methods. The implementation method consisted of preparation and instructional stages. The preparation stage included lesson plan development, curriculum-based material design, and training in the use of technology for creating interactive PowerPoint media. The implementation stage involved presenting cell division material using slides containing text, images, videos, animations, and interactive quizzes. The results indicated an improvement in students' understanding, as reflected in their ability to restate the material and their increased accuracy in answering evaluation questions. These findings are consistent with previous studies highlighting the effectiveness of interactive PowerPoint in enhancing student engagement and learning outcomes. Therefore, systematically and attractively designed PowerPoint media can serve as an innovative alternative to improve the quality of classroom instruction.

**Keywords:** powerpoint media, student learning outcomes

**Abstrak:** Pengabdian ini bertujuan untuk meningkatkan hasil belajar peserta didik melalui pemanfaatan media pembelajaran berbasis teknologi, khususnya Microsoft PowerPoint interaktif, pada pembelajaran Biologi di kelas XII SMA Adhyaksa Ende. Latar belakang penelitian ini didasarkan pada rendahnya hasil belajar siswa akibat dominasi metode ceramah yang berpusat pada guru. Metode pelaksanaan meliputi tahap persiapan dan pelaksanaan pembelajaran. Tahap persiapan mencakup penyusunan perangkat ajar, perancangan materi sesuai kurikulum, serta pelatihan penggunaan teknologi dalam pembuatan media PowerPoint interaktif. Tahap pelaksanaan dilakukan melalui penyajian materi pembelajaran sel menggunakan slide yang memuat teks, gambar, video, animasi, dan kuis interaktif. Hasil kegiatan menunjukkan adanya peningkatan pemahaman siswa yang ditunjukkan melalui kemampuan menjelaskan kembali materi dan meningkatnya ketepatan jawaban pada evaluasi pembelajaran. Temuan ini sejalan dengan berbagai penelitian terdahulu yang menyatakan bahwa PowerPoint interaktif efektif dalam meningkatkan keterlibatan dan hasil belajar siswa. Dengan demikian, penggunaan media PowerPoint yang dirancang secara sistematis dan menarik dapat menjadi alternatif inovatif dalam meningkatkan kualitas pembelajaran.

**Kata Kunci:** media powerpoint, hasil belajar siswa

How to Cite: Ndari, L., Ndore, B. T., Jariyah, A., Wae, V. P. S. M., Wao, Y. P. & Gago, J. (2026). UTILIZATION OF POWERPOINT MEDIA TO IMPROVE STUDENT LEARNING OUTCOMES AT ADHYAKSA ENDE HIGH SCHOOL. *Mitra Mahajana: Jurnal Pengabdian Masyarakat*, 7(1) 76-84. doi: <https://doi.org/10.37478/mahajana.v7i1.7611>

## INTRODUCTION

Education is a planned effort to prepare students to develop their potential and contribute to society. The rapid development of information and communication technology in the 21st century, particularly in the era of industrial revolution 4.0, has had a significant impact on the education system (Rosnaeni, 2021). This transformation requires education to adapt through the integration of technology into the learning process. 21st-century learning is characterized by the use of technology and the strengthening of essential competencies such as problem-solving, communication, collaboration, and digital literacy (Kalyani, 2024). Students are also required to be able to critically manage information and produce technology-based products. These changes are driving a shift from the use of traditional learning media to technology-based media (Mabidi, 2025). Therefore, the integration of technology in learning is a



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crucial need to improve the quality of the learning process and outcomes (Desyandri et al., 2021).

Teachers not only act as sources of information but also as facilitators and guides for students in the learning process (Mardiana et al., 2024). Thus, teachers are required to be creative and innovative in applying various methods, models, strategies, media, and learning tools so that learning objectives can be optimally achieved (Shermukhammadov, 2022). Teachers must also be able to plan learning systematically to produce the expected learning outcomes. In line with this, schools and teachers need to continue to adapt and innovate so that the learning process remains relevant to current developments (Jena & Barad, 2024). This is in accordance with the Minister of Education and Culture Regulation Number 22 of 2016 which states that the learning process must be interactive, inspiring, fun, challenging, encourage active student participation, and provide sufficient space for the development of talents, interests, creativity, and independence in accordance with students' physical and psychological development.

The learning process is a key factor in improving and producing student quality. Learning is viewed as a process that allows students to actively develop their understanding of the knowledge provided (Wu et al., 2024). Therefore, the selection of appropriate learning methods and the use of media play a crucial role in determining the success of classroom learning (Lubis et al., 2023). Learning outcomes are changes that occur in students after participating in the learning process, which include aspects of knowledge (cognitive), attitudes (affective), and skills (psychomotor) (Gunawan et al., 2023). In line with this opinion, Zaenatun et al., (2021) stated that learning outcomes are changes in abilities, skills, attitudes, understanding, knowledge, and values that encompass the cognitive, affective, and psychomotor domains acquired through learning activities. Thus, learning outcomes can be understood as the goal of learning, characterized by changes in students' knowledge, attitudes, and skills after participating in the learning process (Agustian et al., 2022).

However, the learning reality at Adhyaksa Ende High School shows that student learning outcomes are not optimal, influenced by the learning process still dominated by traditional methods, namely the lecture method. In this method, the teacher acts as the centre of learning (teacher-centred), while students tend to be passive (Fufa et al., 2023). This condition has an impact on low student academic achievement. Students only listen to the teacher's explanation without active involvement, so some students become less focused, engage in other activities, and even disrupt the learning process (Paramole et al., 2024). The lack of teacher skills in preparing learning can also lead to low student interest and attention to the material being taught. Therefore, various efforts are needed to improve student learning achievement, one of which is using appropriate learning media. Learning that only relies on traditional methods is considered less effective in creating meaningful learning experiences (Lubis et al., 2023).

To address these issues, learning innovations are needed that can increase student engagement and learning outcomes. One viable alternative is the use of technology-based learning media, such as Microsoft PowerPoint (Indra et al., 2023). This use aligns with Mayer's Cognitive Theory of Multimedia Learning, particularly the dual-channel principle, which states that information is processed simultaneously through verbal and visual channels, thereby enhancing student understanding (Fatwa et al., 2025). Empirically, Dewi & Manuaba (2021) stated that Microsoft PowerPoint is an effective software for compiling and presenting learning materials. Pambudi et al. (2021) also explained that interactive PowerPoint containing materials, videos, and quizzes can increase learning efficiency, train higher-order thinking skills, and positively influence student learning outcomes, particularly in the cognitive domain. Thus, the use of PowerPoint media has the potential to support improvements in the quality of learning processes and outcomes (Setiawan et al., 2023).

Various studies have demonstrated the effectiveness of using interactive PowerPoint media in improving student learning outcomes. Rahmani & Abduh (2022), citing Pramestika's research, reported that the application of interactive PowerPoint to mathematics materials showed improved learning outcomes. Similar findings were presented by Putri & Nurafni (2021) based on Sugama's research, which stated that the use of interactive PowerPoint media

had an impact on improving student grades. Susilowati et al. (2021) also emphasized that the use of interactive PowerPoint media can increase student engagement and enthusiasm, as well as help them analyze problems and draw accurate conclusions. Based on these various research findings, it can be concluded that the use of interactive PowerPoint media has consistently proven effective in improving student engagement, understanding, and learning outcomes.

## METHOD

The first stage in implementing learning is preparing learning materials, namely, the preparation of materials to be presented using PowerPoint. The materials selected are adapted to the applicable curriculum and the needs of students at Adhyaksa Ende High School. The use of PowerPoint is expected to help students understand abstract concepts through clearer and more systematic visual presentations. The learning materials are structured sequentially to facilitate students' follow-through (Parette et al., 2009). The PowerPoint presentations were then designed to be engaging and informative. The PowerPoint presentations included various supporting elements, such as core material, images, graphics, videos, and animations relevant to the learning topic (Das et al., 2025). The use of these visual elements aimed to enhance the learning experience and aid student comprehension. Furthermore, appropriate colour selection and the use of easy-to-read fonts and sizes ensured students felt comfortable and focused throughout the learning process (Nieves et al., 2024).

Once the PowerPoint presentation is complete, the next step is implementing the lesson in class. Learning using PowerPoint is conducted over several sessions. Each session begins with a presentation, followed by a discussion to deepen students' understanding. The teacher acts as a facilitator, guiding and encouraging students to actively participate in the learning process by utilizing the interactive features within PowerPoint (Muhja & Rosdiana, 2026). During the learning process, the primary tool used is a computer or laptop equipped with Microsoft PowerPoint. Additionally, a projector or LCD screen is used to display learning materials so that they can be seen by all students in the class. To support interactivity and increase student engagement, additional media such as quizzes or practice problems presented in PowerPoint are also used (Muir et al., 2022).

## RESULTS AND DISCUSSION

The results of the community service activities demonstrated that the use of engaging PowerPoint presentations focusing on core learning materials significantly improved students' understanding of the subject matter (Aifan, 2022). The presentation of learning materials in a visual, systematic, and interactive format enabled students to more easily identify essential concepts and understand the relationships between them (Chisunum & Nwadiokwu, 2024). Through well-organized slides, students were able to follow the learning flow more clearly, which helped them construct knowledge in a more structured manner. The integration of images, diagrams, animations, and short videos also contributed to increasing students' attention and motivation during the learning process (Utaminingsih, et al., 2024)

This improvement in students' understanding was evident from several indicators observed during the activity. Students were able to re-explain the concept of cell division using their own words and demonstrate a clearer understanding of the stages involved in the process (Puspitasari, 2025). Furthermore, the results of the learning evaluation showed an increase in the accuracy and completeness of students' answers. Students were also more active in asking questions, participating in discussions, and responding to the material presented through interactive slides (Muir, et al., 2022). These findings indicate that the use of PowerPoint as a learning medium can effectively support the delivery of complex biological concepts (Andini et al., 2024).

The implementation of this activity began with a preparatory phase aimed at ensuring that the learning media used were pedagogically appropriate and aligned with the learning objectives (Hilman et al., 2025). During this stage, assisted students received training in developing teaching materials and utilizing learning technology effectively (Liu & Wang, 2024). They were guided in designing lesson plans (RPP), organizing learning objectives, and compiling instructional materials based on the relevant core competencies and basic competencies (Akmaliyah & Hidayat, 2022). This guidance helped students understand how to structure teaching materials so that they are coherent, systematic, and aligned with curriculum requirements (Zhao et al., 2023).

In addition, the training also focused on improving students' skills in designing effective PowerPoint presentations for educational purposes. Participants were introduced to various techniques for creating interactive and engaging slides, such as the use of visual illustrations, educational videos, animations, and interactive quizzes (Lu & Hanim, 2024). These elements were incorporated to make the learning process more dynamic and to encourage student participation during the lesson (Eshkobilova & Aziza, 2025). Students were also trained to design evaluation questions that could be integrated directly into the slides, allowing teachers to assess student understanding in real time during the learning process (Kavadella et al., 2024).

Overall, this preparatory phase played an important role in ensuring that the implementation of the learning media was not only technically feasible but also pedagogically meaningful (Chisunum & Nwadiokwu, 2024). By combining well-structured teaching materials with interactive presentation media, the learning process became more engaging, effective, and supportive of students' conceptual understanding (Prykhodkina et al., 2025). The results of this community service activity therefore highlight the potential of technology-based learning media, particularly PowerPoint, to enhance both teaching practices and student learning outcomes in the classroom (Aifan, 2022).



**Figure 1.** *Implementation of powerpoint media figure*

In biology learning practices among grade XII students at Adhyakasa Senior High School in Ende, PowerPoint is utilized not only as a medium for presenting learning materials but also as a digital resource that can be easily accessed by students through their mobile devices (Stevani & Sucahyo, 2022). This approach allows students to review the material independently outside the classroom, thereby supporting continuous learning. By distributing the presentation files digitally, students are given greater flexibility to revisit key concepts, review explanations, and reinforce their understanding of the lesson at their own pace (Sargent & Casey, 2020).

The integration of questions and quizzes at each stage of the material presentation also plays an important role in encouraging active participation during the learning process. Instead of merely listening to explanations, students are invited to engage with the material through short evaluative questions, discussions, and quick quizzes embedded within the slides (Ruado & Cortez, 2024). This interactive approach stimulates students' curiosity, encourages them to think critically about the concepts being discussed, and provides immediate feedback on their level of understanding (Agustini et al., 2024). As a result, the learning process becomes more student-centered, where students actively participate rather than passively receive information.



**Figure 2.** *Quiz work as a result of evaluation*

Furthermore, the visualization of the cell division process through images, diagrams, animations, and short videos significantly helps students understand abstract biological concepts (Mnguni & Moyo, 2021). Cell division, which involves complex and microscopic processes such as mitosis and meiosis, can be difficult for students to grasp through verbal explanation alone (Cossa, et al., 2008). By presenting these processes visually, students can observe the sequence of stages more clearly and understand how each phase relates to the next. This visual representation helps transform abstract theoretical explanations into more concrete and comprehensible learning experiences. Consequently, the use of multimedia elements within PowerPoint makes the learning process more engaging, meaningful, and less monotonous (Das et al., 2025).

The findings from this activity are consistent with several previous studies that highlight the effectiveness of interactive PowerPoint media in improving learning outcomes. Research conducted by Rahmani & Abduh (2022), Putri & Nurafni (2021) and Desyandri et al., (2023) revealed that the use of interactive PowerPoint presentations can significantly enhance student engagement, motivation, and overall academic performance. These studies emphasize that well-designed presentation media can support the delivery of complex concepts in a more structured and visually appealing manner.

Similarly, Susilowati et al. (2021) confirmed that interactive PowerPoint-based learning media not only increases student engagement but also contributes to the development of students' analytical and critical thinking skills. By integrating multimedia elements and interactive evaluation activities, PowerPoint can function as an effective instructional tool that supports both cognitive understanding and active learning participation (Muhja et al., 2026). Therefore, the results of this community service activity further reinforce previous research findings that systematically designed and interactive PowerPoint media can play a significant role in improving the quality of classroom learning. When used appropriately, PowerPoint presentations that incorporate visual elements, interactive questions, and structured explanations can enhance students' conceptual understanding, increase their engagement during the learning process, and ultimately improve student learning outcomes (Lin et al., 2016).

## CONCLUSION

The use of PowerPoint as a learning medium in high school biology classes can significantly support the effectiveness of the teaching and learning process. For teachers, PowerPoint functions as an instructional medium that helps organize and present learning materials in a clear, systematic, and sequential manner. Through well-structured slides, teachers are able to deliver concepts more effectively while maintaining students' attention during the lesson. The integration of visual elements such as images, diagrams, animations, and short videos also enables teachers to present complex biological concepts more engagingly and understandably. Therefore, the use of PowerPoint can serve as a practical guideline for teachers in designing and implementing more interactive and meaningful learning activities, ultimately contributing to improved learning quality in the classroom.

For students, the use of PowerPoint as a learning medium provides several important benefits. Interactive presentations can increase students' motivation to participate in learning activities and encourage them to be more actively involved in the learning process. The combination of visual explanations, structured information, and interactive questions helps students understand the material more easily compared to conventional lecture-based methods. In addition, the inclusion of questions, quizzes, and discussion prompts within the presentation can stimulate students' ability to think critically and analyze the material that has been presented by the teacher. As a result, students not only receive information but also develop a deeper conceptual understanding of the subject matter. Overall, the use of interactive PowerPoint presentations in biology learning creates a more engaging and supportive learning environment. This approach helps students understand abstract biological concepts more concretely, improves their learning motivation, and contributes to better learning outcomes. Therefore, PowerPoint can be considered an effective learning medium that supports both teachers and students in achieving the objectives of biology learning at the high school level.

## REFERENCES

- Agustian, H. Y., Finne, L. T., Jørgensen, J. T., Pedersen, M. I., Christiansen, F. V., Gammelgaard, B., & Nielsen, J. A. (2022). Learning outcomes of university chemistry teaching in laboratories: A systematic review of empirical literature. *Review of Education*, 10(2), e3360. <https://doi.org/10.1002/rev3.3360>
- Agustini, R., Meilanie, R. S. M., & Pujiastuti, S. I. (2024). Enhancing critical thinking and curiosity in early childhood through inquiry-based science learning. *Aulad: Journal on Early Childhood*, 7(3), 734-743. DOI: <https://doi.org/10.31004/aulad.v7i3.780>
- Akmaliyah, A., & Hidayat, H. (2022). Developing Online Learning Based Lesson Plan for Teaching Speaking in 21st Century. *Foreign Language Instruction Probe*, 1(2), 140-150. DOI: <https://doi.org/10.54213/flip.v1i2.173>
- Aifan, H. (2022). Implementing a project-based collaborative learning approach using PowerPoint to improve students' 21st-century skills. *E-Learning and Digital Media*, 19(3), 258-273. <https://doi.org/10.1177/20427530211030642>
- Andini, D., Harahap, H. S., & Machrizal, R. (2024). Powering Up Learning: How Interactive PowerPoint Transforms Student Engagement and Outcomes in Biology. *Utamax: Journal of Ultimate Research and Trends in Education*, 6(1), 23-32. DOI: <https://doi.org/10.31849/utamax.v6i1.18588>
- Chisunum, J. I., & Nwadiokwu, C. (2024). Enhancing student engagement through practical production and utilization of instructional materials in an educational technology class: A multifaceted approach. *NIU Journal of Educational Research*, 10(2), 81-89. DOI: <https://doi.org/10.58709/niuved.v10i2.2002>
- Cossa, E., Holtman, L., Ogunniyi, M., & Mikalsen, O. (2008). Assessing students' understanding of cell division in an undergraduate biology course: a qualitative perspective. *African Journal*

- of Research in Mathematics, Science and Technology Education*, 12(2), 17-30.  
<https://hdl.handle.net/10520/EJC92686>
- Das, S., Malik, A., Tripathy, S. K., & Sahoo, M. (2025). How to Improve the Quality of PowerPoint Presentation to Achieve Maximum Learning. *Research and Reviews in Pediatrics*, 26(2), 31-36. DOI: 10.4103/rrp.rrp\_10\_24
- Desyandri, D., Yeni, I., Mansurdin, M., & Dilfa, A. H. (2021). Digital Student Songbook as Supporting Thematic Teaching Material in Elementary School. *Jurnal Ilmiah Sekolah Dasar*, 5(2), 342-350. <https://doi.org/10.23887/jisd.v5i2.36952>
- Dewi, N. L. P. S., & Manuaba, I. B. S. (2021). Pengembangan Media Pembelajaran Powerpoint Interaktif Pada Mata Pelajaran IPA Siswa Kelas VI SD. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 5(1), 76-83. DOI: <https://doi.org/https://doi.org/10.23887/jppp.v5i1.3276>
- Eshkobilova, O., & Aziza, B. (2025). ENCOURAGING STUDENT PARTICIPATION IN EVERY LESSON. *Modern education and development*, 37(2), 301-303. <https://journalss.org/index.php/mod/article/view/4763>
- Fatwa, M. F. M. A., Patta, A. R., & Putra, K. P. (2025). Efektifitas Pembelajaran Berbasis Multimedia Interaktif Dengan Prinsip Mayer Terhadap Hasil Belajar Menggunakan Aplikasi Autoplay Media Studio. *Journal of Computers, Informatics, and Vocational Education*, 2(1), 1-9. <https://journal.unm.ac.id/index.php/CIVE/article/view/6540>
- Fufa, F. S., Tulu, A. H., & Ensene, K. A. (2023). Examining the challenges of using student-centred teaching strategies in secondary schools: A qualitative approach. *Journal of Pedagogical Sociology and Psychology*, 5(3), 61-72. <https://doi.org/10.33902/jpsp.202323181>
- Gunawan, G., Yanti, P. R., & Nelson, N. (2023). Methods for achieving cognitive, affective, and psychomotor aspects in Islamic religious education learning: a study at senior high school in Rejang Lebong. *Al-Ishlah: Jurnal Pendidikan*, 15(1), 981-991. DOI: <https://doi.org/10.35445/alishlah.v15i1.2793>
- Hilman, C., Rohmah, S., & Syarifah, M. (2025). Techniques for selecting learning media in Madrasah Ibtidaiyah educational institutions. *Digital Theory, Culture & Society*, 3(1), 1-7. DOI: <https://doi.org/10.61126/dtcs.v3i1.46>
- Indra, M. H., Sutarto, S., Kharizmi, M., Nurmiati, A. S., & Susanto, A. (2023). Optimizing the Potential of Technology-Based Learning Increases Student Engagement. *Al-Fikrah: Jurnal Manajemen Pendidikan*, 11(2), 233-244. DOI: <https://doi.org/10.31958/jaf.v11i2.10554>
- Kalyani, L. K. (2024). The role of technology in education: Enhancing learning outcomes and 21st century skills. *International journal of scientific research in modern science and technology*, 3(4), 05-10. DOI: <https://doi.org/10.59828/ijsrmst.v3i4.199>
- Kavadella, A., Da Silva, M. A. D., Kaklamanos, E. G., Stamatopoulos, V., & Giannakopoulos, K. (2024). Evaluation of ChatGPT's real-life implementation in undergraduate dental education: mixed methods study. *JMIR Medical Education*, 10(1), e51344. doi:10.2196/51344
- Lin, J. W., Yen, M. H., Liang, J., Chiu, M. H., & Guo, C. J. (2016). Examining the factors that influence students' science learning processes and their learning outcomes: 30 years of conceptual change research. *Eurasia Journal of Mathematics, Science and Technology Education*, 12(9), 2617-2646. <https://doi.org/10.12973/eurasia.2016.000600a>
- Liu, W., & Wang, Y. (2024). The effects of using AI tools on critical thinking in English literature classes among EFL learners: An intervention study. *European Journal of Education*, 59(4), e12804. <https://doi.org/10.1111/ejed.12804>
- Lu, B., & Hanim, R. N. (2024). Enhancing Learning Experiences through Interactive Visual Communication Design in Online Education. *Eurasian Journal of Educational Research (EJER)*, (109). DOI: 10.14689/ejer.2024.109.009
- Lubis, L. H., Febriani, B., Yana, R. F., Azhar, A., & Darajat, M. (2023). The use of learning media and its effect on improving the quality of student learning outcomes. *International Journal Of Education, Social Studies, And Management (IJESSM)*, 3(2), 7-14. DOI: <https://doi.org/10.52121/ijessm.v3i2.148>

- Mabidi, N. I. (2025). From traditional to digital: Transforming education through communication media in the 21st century. *South African Journal of Education*, 45(4), 1-11. <https://journals.co.za/doi/epdf/10.15700/saje.v45n4a2697>
- Mardiana, E., Kusuma, Z. N. A. W., & Iskandar, S. (2024). Karakteristik dan peran guru sebagai fasilitator pembelajaran abad 21 di sekolah dasar. *Pendas: Jurnal Ilmiah Pendidikan Dasar*, 9(4), 247-256. DOI: <https://doi.org/10.23969/jp.v9i4.20988>
- Mnguni, L., & Moyo, D. (2021). An assessment of the impact of an animation on biology students' visualization skills related to basic concepts of mitosis. *Eurasia Journal of Mathematics, Science and Technology Education*, 17(8), em1997. <https://doi.org/10.29333/ejmste/11116>
- Muhja, A. N. A., & Rosdiana, R. (2026). The Role Of Interactive Powerpoint In Student Participation. *Golden Ratio of Data in Summary*, 6(1), 26-32. <https://doi.org/10.52970/grdis.v6i1.2013>
- Muir, T., Wang, I., Trimble, A., Mainsbridge, C., & Douglas, T. (2022). Using interactive online pedagogical approaches to promote student engagement. *Education Sciences*, 12(6), 415. <https://doi.org/10.3390/educsci12060415>
- Nieves, L. H., De La Hoz Vargas, V., Roncallo, E. C., & Gutiérrez, A. H. (2024). Making written texts for learning more accessible with easy-to-read and universal design. *South African Journal of Education*, 44(1), 1-10. [https://hdl.handle.net/10520/ejc-educat\\_v44\\_n1\\_a1](https://hdl.handle.net/10520/ejc-educat_v44_n1_a1)
- Pambudi, S., Rezkita, S., & Purwaningsih, E. (2021). Upaya Meningkatkan Kedisiplinan Dan Hasil Belajar Matematika Siswa Melalui Penggunaan Media Power Point Interaktif. *Jurnal Ilmiah Profesi Guru (JIPG)*, 02(02), 1-9. DOI: <https://doi.org/https://doi.org/10.30738/.v2i2.11312>
- Paramole, O. C., Adeoye, M. A., Arowosaye, S. A., & Ibikunle, Y. A. (2024). The impact of active listening on student engagement and learning outcomes in educational settings. *International Journal of Universal Education*, 2(2), 77-89. <https://journal.umpr.ac.id/index.php/ijue/article/view/8898>
- Parette, H. P., Blum, C., Boeckmann, N. M., & Watts, E. H. (2009). Teaching word recognition to young children who are at risk using Microsoft® PowerPoint™ coupled with direct instruction. *Early Childhood Education Journal*, 36(5), 393-401. <https://doi.org/10.1007/s10643-008-0300-1>
- Prykhodkina, N., Tsynova, M., Kravets, H., Hrechanovska, O., & Nichyshyna, V. (2025). The role of interactive technologies in improving the quality of learning and development of scientific competences in modern education. *Periodicals of Engineering and Natural Sciences*, 13(1), 69-82. DOI: <https://doi.org/10.21533/pen.v13.i1.253>
- Puspitasari, R. (2025). Student Learning Styles in Science Learning and Their Influence on Concept Understanding. *Scientica Education Journal*, 2(3), 30-38. DOI: <https://doi.org/10.62872/sej.v2i3.309>
- Putri, H. P., & Nurafni, N. (2021). Pengaruh Media Pembelajaran PowerPoint Interaktif terhadap Hasil Belajar IPS Siswa Sekolah Dasar. *Edukatif: Jurnal Ilmu Pendidikan*, 3(6), 3538-3543. DOI: <https://doi.org/10.31004/edukatif.v3i6.986>
- Rahmani, R. A., & Abduh, M. (2022). Efektivitas Media PowerPoint Interaktif Terhadap Motivasi dan Hasil Belajar Kognitif Masa Pandemi. *Jurnal Basicedu*, 6(2), 2456-2465. DOI: <https://doi.org/10.31004/basicedu.v6i2.2378>
- Rosnaeni, R. (2021). Karakteristik dan asesmen pembelajaran abad 21. *Jurnal Basicedu*, 5(5), 4334-4339. DOI: [10.31004/basicedu.v5i5.1548](https://doi.org/10.31004/basicedu.v5i5.1548)
- Ruado, L. F., & Cortez, L. A. S. (2024). Enhancing student engagement and achievement in biology through interactive slide presentations. *American Journal of Education and Technology*, 3(1), 51-59. <https://doi.org/10.54536/ajet.v3i1.2520>
- Sargent, J., & Casey, A. (2020). Flipped learning, pedagogy and digital technology: Establishing consistent practice to optimise lesson time. *European physical education review*, 26(1), 70-84. <https://doi.org/10.1177/1356336X19826603>
- Setiawan, A., Nugroho, W., & Widyaningtyas, D. (2023). Development of interactive powerpoint learning media based on information and communication technologies to improve

- student learning outcomes. *Jurnal Pendidikan Dasar Nusantara*, 9(1), 75-86. DOI: <https://doi.org/10.29407/jpdn.v9i1.20056>
- Shermukhammadov, B. (2022). Creativity of a Teacher in an Innovative Educational Environment. *Journal of Higher Education Theory and Practice*, 22(12), 126-132. DOI: 10.33423/jhetp.v22i12.5468
- Stevani, F., & Sucahyo, I. (2022). Development of Android-Based Learning Media Using Microsoft Powerpoint Integrated Ispring Suite on Class X's Work and Energy Materials. *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, 10(3), 688-699. DOI: <https://doi.org/10.33394/j-ps.v10i3.5422>
- Susilowati, W., Harsan, T., Hadiprasetyo, K., Veteran, U., Nusantara, B., Veteran, U., Nusantara, B., Veteran, U., & Nusantara, B. (2021). Peningkatan Kemampuan Berfikir Kritis Dan Hasil Belajar Ips Melalui Media Powerpoint Interaktif. *Jurnal Dikdas Bantara*, 4(2), 138-149. DOI: <https://doi.org/https://doi.org/10.32585/dikdasbantara.v4i2.1685>
- Tafonao, T. (2018). Peranan Media Pembelajaran Dalam Meningkatkan Minat Belajar Mahasiswa. *Jurnal Komunikasi Pendidikan*, 2(2), 103. <https://doi.org/10.32585/jkp.v2i2.113>
- Utaminingsih, S., Machfud, S., & Kassymova, G. K. (2024). Development of learning management with animated video to increase motivation and learning outcomes. *Journal of Advanced Research in Applied Sciences and Engineering Technology*, 41(2), 31-42. <https://doi.org/10.37934/araset.41.2.3142>
- Wu, D., Zhang, S., Ma, Z., Yue, X. G., & Dong, R. K. (2024). Unlocking potential: Key factors shaping undergraduate self-directed learning in AI-enhanced educational environments. *Systems*, 12(9), 332. <https://doi.org/10.3390/systems12090332>
- Zaenatun, A., Setiani, A. A., Farrah, R., Widyastuti, R., & Aeni, A. N. (2021). Pengaruh Pembelajaran Terpadu Terhadap Hasil Belajar Siswa di Sekolah Dasar. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, 5(2), 183. DOI: <https://doi.org/10.24036/jippsd.v5i2.11517>
- Zhao, L., Zhao, B., & Li, C. (2023). Alignment analysis of teaching-learning-assessment within the classroom: how teachers implement project-based learning under the curriculum standards. *Disciplinary and Interdisciplinary Science Education Research*, 5(1), 13. <https://doi.org/10.1186/s43031-023-00078-1>