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The Effect of The Implementation of Science Park on Students' Motivation and Learning Enthusiasm

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Abstract: This study addresses the urgent need to counter declining motivation and learning enthusiasm in physics. The research aimed to examine the effect of implementing a simple science park—organised as low-cost experimental stations—on students' motivation and enthusiasm for learning physics. Using a qualitative descriptive design with a pre–post comparison between an experimental and a control class, data were collected through classroom observations, a short test, and a motivation questionnaire. Results show that the average motivation score increased from 60% before the intervention to 80% after the science-park-based activities, supported by questionnaire responses indicating higher interest, focus, persistence in completing tasks, and reduced boredom. These findings suggest that structured, hands-on science park experiments can meaningfully enhance students' affective engagement in physics learning. It is recommended that schools and teachers adopt or adapt science park models using simple, local materials, and that future research with larger samples and more rigorous designs further investigate long-term effects on motivation, achievement, and critical thinking.

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Introduction

Sustaining students' motivation and enthusiasm for learning has become a central concern in contemporary education because these affective factors strongly predict engagement, persistence, and achievement, particularly in science and physics education (Guido, 2018; Pečiuliauskienė, 2023. Survey studies in Indonesian secondary schools consistently show that students' motivation to learn physics is generally in the medium rather than the high category, indicating substantial room for pedagogical improvement (Sari, 2017; Sukmawati, 2022). These studies further suggest that many learners perceive physics as difficult and abstract, which contributes to limited enthusiasm and a tendency to disengage from challenging problem-solving tasks (Guido, 2018). At the same time, the rapid diffusion of smartphones into students' daily lives has introduced new sources of distraction that can displace academic effort and undermine intrinsic motivation for learning when their use is poorly regulated (Purushotama & Nainggolan, 2025). Empirical work at the primary and secondary levels in Indonesia indicates that excessive or poorly managed gadget use is associated with lower interest in learning and weaker discipline. In contrast, well-designed restrictions on smartphone use can enhance students' attention and interest in learning (Suswandi & Ripandi, 2024). Taken together, these findings highlight the urgent need for teachers to design learning environments that counteract digital distractions and systematically foster positive motivation and enthusiasm, especially in physics lessons where students frequently experience anxiety and low self-confidence (Purushotama & Nainggolan, 2025).

A substantial body of research demonstrates that active, student-centred pedagogies in science, such as inquiry-based learning, problem-based tasks, and structured hands-on activities, are more effective than teacher-centred lectures for promoting conceptual understanding, motivation, and long-term interest (Ganajová et al., 2025; Teplá & Distler, 2025; Kotsis, 2024; Purnomo, Nugraha, & Rahayu, 2021). In physics education, carefully designed experimental activities provide direct experience with phenomena, strengthen scientific process skills, and make abstract ideas more concrete, thereby reducing boredom and passivity during lessons (Hanifah et al., 2023; Chen et al., 2025). Classroom studies in Indonesian contexts show that the experimental method can significantly improve students' physics learning outcomes and simultaneously raise their motivation compared with conventional expository approaches dominated by lecturing (Azka et al., 2020; Sari & Oransa, 2025). Similarly, hands-on science activities have been found to foster curiosity, enjoyment, and positive attitudes towards science among younger learners, with sustained effects on their willingness to engage in further STEM learning (Yılmaz et al., 2024). International meta-analytic evidence on inquiry-based science education indicates that learning environments rich in investigation, experimentation, and student autonomy are associated with higher motivation, stronger affective engagement, and more favourable attitudes toward science and technology (Ganajová et al., 2025; Teplá & Distler, 2025). Nevertheless, teachers continue to report difficulties in planning and managing meaningful experimental learning, especially in large classes or schools with limited laboratory facilities, motivating the exploration of alternative formats that provide intensive yet manageable experimental exposure (Irawati et al., 2025).

One promising strategy for integrating experimentation into regular instruction is the development of a school-based science park, conceptualised as an interactive learning environment often outdoors or in a dedicated area where students explore a sequence of simple experiments and exhibits that are explicitly aligned with curriculum content (Hwang et al., 2012; Sianturi, 2024; Mirjaz & Abioso, 2023). Studies in Asian contexts show that science parks and analogous informal learning spaces can support scientific inquiry by enabling context-aware, ubiquitous learning experiences that connect school science with everyday phenomena and authentic environments (Hwang et al., 2012; Chen et al., 2025). Experimental research on context-aware science-park-based inquiry has reported gains in students' learning achievements, inquiry skills, and motivation when compared with conventional classroom-bound instruction (Ganajová et al., 2025). Within the Indonesian school context, science-park-inspired props and outdoor learning spaces such as magnetic science park kits and "education garden" designs have been shown to enhance conceptual understanding in science and provide more varied, enjoyable learning experiences for students (Sianturi, 2024; Husamah, 2013). Concept- and literacy-oriented science park designs typically emphasise the use of low-cost, locally available materials, making them attractive options for schools that lack permanent laboratories but aim to cultivate students' process skills and critical thinking (Sianturi, 2024; LabWale, 2024). However, despite these advantages, empirical studies that explicitly examine how the implementation of a science park in formal physics lessons affects students' motivation and learning enthusiasm—particularly at the secondary-school level remain relatively scarce in both national and international literature, where most work focuses on conceptual understanding, science literacy, or general attitudes toward science (Sianturi, 2024; Hwang et al., 2012; Ganajová et al., 2025).

Building on these prior findings, the present study investigates the effect of implementing a simple science park on students' motivation and learning enthusiasm in the classroom context. (Azka et al., 2020). In this study, the science park is conceptualised as a series of low-cost, curriculum-aligned experimental stations that students visit in small groups under teacher guidance to explore core physics concepts through structured hands-on activities (Hwang et al., 2012; LabWale, 2024; Purnomo et al., 2021). The primary objective is to determine whether this intervention can significantly enhance students' motivation and enthusiasm during physics lessons compared with existing instructional practices that rely more heavily on teacher explanation and demonstration (Azka et al., 2020; Sukmawati, 2022; Sari, 2017). By simultaneously foregrounding affective outcomes (motivation and enthusiasm) and the design of a feasible, resource-conscious science park model, the study seeks to generate evidence for practical strategies that teachers can adopt to counteract digital distractions and reinvigorate students' engagement with physics learning (Purushotama & Nainggolan, 2025; Suswandi & Ripandi, 2024; Chen et al., 2025; Hanifah et al., 2023). The findings are expected to enrich the growing literature on inquiry-based and informal science learning environments while offering context-specific guidance for Indonesian schools aiming to design science parks that not only improve conceptual understanding but also nurture enduring enthusiasm for learning physics.

Research Method

This study employed a qualitative descriptive design to obtain a rich, straightforward account of classroom events and changes in students' motivation and learning enthusiasm in everyday language (Sandelowski, 2000). Consistent with qualitative descriptive research in education, the inquiry was carried out as classroom-based observation focusing on how a pedagogical intervention was implemented and experienced by students (Arianti et al., 2025). The study adopted a pretest–posttest control-group design, in which one class served as the experimental group receiving science park–based learning activities, while a comparison class continued with existing instructional practices, enabling comparison between the conditions with and without the treatment (Dugard & Todman, 2006). Observations were conducted twice: a first observation under normal teaching conditions (without the science park intervention) and a second observation after the science park had been implemented in the experimental class, whereas the control class was still taught using regular methods, so that differences in students' engagement and enthusiasm across the two phases could be documented (Farani & Ma'rufah, 2022). The participants comprised students from one experimental and one control class at the target school, selected using non-random classroom-based sampling procedures typical of qualitative descriptive and quasi-experimental school research (Furidha et al., 2023). The questionnaire was developed following common practice in motivation research by using Likert-type response scales, subject to expert judgment for content validity, and Quantitative data from tests and questionnaires were analysed using descriptive statistics such as means, percentages, and comparative summaries between the first and second observations for both classes. In contrast, observational records were analysed using qualitative descriptive methods to portray changes in students' motivation and enthusiasm before and after the implementation of the science park (Nurjayanti et al., 2025).

Result and Discussion

Data for this study were collected in two classroom observation sessions on 7 and 14 November 2024, following a pre–post comparison logic widely used in quasi-experimental research on science motivation and hands-on activities in school settings (Yılmaz et al., 2024). Consistent with previous physics-education studies that operationalise learning motivation using Likert-type questionnaires converted to indices or percentage scores, students' motivation in this study was represented on a 10-point scale and then expressed as a percentage to facilitate interpretation (Setiaji et al., 2024). Before the intervention, the comparison condition yielded an average motivation score of 6 out of 10 (60%). In contrast, after implementing science-park-based simple experiments in the experimental class,, the average increased to 8 out of 10 (80%), indicating a 20-percentage-point gain between the non-treatment and treatment observations. The magnitude and direction of this increase are consistent with prior Indonesian and international findings showing that experimental methods and hands-on media in physics systematically enhance students' learning motivation and outcomes compared with conventional instruction. From the perspective of learning-environment research, the introduction of a science park can be viewed as a shift toward a more student-centred, inquiry- and mastery-oriented classroom climate. This configuration has been repeatedly associated with higher motivation, engagement, and satisfaction in science learning (Nolen, 2003).

The item-level analysis of the ten questionnaire aspects further clarifies how science-park activities shaped students' motivation and enthusiasm for learning. Students' perceptions that the physics material was largely "not too difficult" (around 80% indicating low difficulty) align with evidence that lower perceived difficulty and higher self-efficacy are positively related to motivation in physics and science more broadly (Yusrizal & Hanif, 2017). All students (100%) agreed or strongly agreed that the simple experiments were interesting and enjoyable, supporting extensive research showing that hands-on, minds-on activities substantially increase the affective value of science lessons and students' willingness to re-engage with similar tasks (Yilmaz et al., 2024). Behavioural indicators were also favourable: between 70% and 100% of students reported that they repeated lessons at home, completed assignments, and submitted homework on time, which is consistent with prior work linking higher science motivation to greater persistence, homework completion, and productive study behaviours (Nolen, 2003). Approximately 80% of students indicated that they would ask the teacher when material was not understood and that they paid serious attention during explanations, suggesting that the science-park intervention supported perceived competence and strengthened teacher–student relationships, two central determinants of engagement in self-determination-theory-based analyses of science classrooms (Wood, 2019). Moreover, the very high proportion of disagreement with statements such as "I prefer to joke when the teacher explains" and "I feel lazy during lessons" (65–100% disagree or strongly disagree) indicates a classroom climate that was simultaneously focused and enjoyable, mirroring the profile of effective active-learning environments reported in large-scale syntheses and recent studies on hands-on engagement.

Taken together, these findings suggest that even within a small sample, structured science-park-based experiments can serve as a motivational catalyst, enhancing both cognitive and emotional engagement in physics learning (Azka et al., 2020). The observed 20-point increase in the motivation index and the uniformly positive pattern of behavioural indicators are congruent with meta-analytic and empirical evidence that active learning, practical work, and hands-on inquiry in science and STEM lead to higher performance, interest, and motivation than lecture-centred approaches. At a theoretical level, the data resonate with self-determination and expectancy–value explanations of motivation, in which students are more likely to engage when they experience learning as enjoyable, feel competent to master the material, and perceive their effort as instrumental for valued outcomes such as achievement and recognition (Wood, 2019). The presence of a minority of students who did not always repeat lessons or complete homework, however, indicates that individual and contextual factors—such as prior attitudes, home support, or competing digital distractions—continue to moderate intervention effects, as also reported in other studies of science-learning motivation (Setiaji et al., 2024). Given the very small number of participants (two classes of six students) and the descriptive, non-inferential design, these results should be interpreted as indicative rather than conclusive, reinforcing calls in the literature for larger-scale studies that employ validated multi-item motivation instruments and more rigorous control or comparison conditions when evaluating science-park-based interventions. Even with these limitations, the present study contributes to national and international discussions on science parks and hands-on learning by providing concrete school-level evidence that simple, low-cost experimental setups organised as a science park can meaningfully raise students' motivation and enthusiasm for learning physics (Sianturi, 2024).

Conclusion

Based on the results of this study, it can be concluded that implementing a science park through a series of simple physics experiments effectively enhances students' motivation and learning enthusiasm. This is reflected in the increase in the motivation score from 60% before the treatment to 80% after the treatment, as well as in the questionnaire responses showing that most students viewed the experimental activities as interesting, enjoyable, not too difficult, and supportive of their focus, willingness to ask questions, completion of assignments, and efforts to achieve good grades. These findings indicate that a simple yet structured science-park-based learning design can be an effective instructional strategy to reduce boredom and increase students' engagement in physics learning in the classroom.

Recommendation

In the future, it is expected that science-park-based learning through simple physics experiments can be implemented sustainably and expanded to other physics topics, so that it not only enhances students' learning motivation but also positively contributes to their conceptual understanding, science process skills, and the overall quality of physics learning.

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References

Arianti, C. A. L. E., Sama, A., & Dewi, I. Y. M. (2025). Navigating deep learning pedagogy in rural classrooms: A qualitative study on teacher readiness and innovation in Indonesian elementary schools. *Journal Evaluation in Education (JEE), 6*(3), 725–736.

Azka, M., Sudarmanto, A., & Yusufiyah, H. K. N. (2020). Pengaruh metode eksperimen terhadap motivasi dan hasil belajar siswa kelas X pada materi gerak lurus. *Physics Education Research Journal, 2*(1), 9–18.

Azka, R., Rostikawati, D., & Husnussalam, H. (2020). Pengaruh metode eksperimen terhadap motivasi dan hasil belajar peserta didik pada pembelajaran fisika. *Jurnal Penelitian dan Pengembangan Pendidikan Fisika, 6*(2), 241–248.

Chen, C., Abdul Rabu, S. N., & Jamiat, N. (2025). Enhancing physics learning achievement, motivation and inquiry skills in a flipped classroom: A structured inquiry-based virtual lab approach. *Journal of Baltic Science Education, 24*(1), 37–52.

Di Domenico, S. I., & Ryan, R. M. (2017). The emerging neuroscience of intrinsic motivation: A new frontier in self-determination research. *Frontiers in Human Neuroscience, 11*, 145. https://doi.org/10.3389/fnhum.2017.00145

Dugard, P., & Todman, J. (2006). Analysis of pretest–posttest control group designs in educational research. *Educational Psychology, 15*(2), 181–198.

Farani, R., & Ma'rufah, Q. (2022). Observing teacher's motivational teaching practices in an EFL class during Covid-19 pandemic. *ELLIC Journal, 5*(1), 1–8.

Fitriani, F., Syahrin, A., & Dewi, S. L. (2025). Enhancing students' motivation and learning outcomes through the problem-solving learning model at elementary school. *AL-ISHLAH: Jurnal Pendidikan, 17*(3), 4171–4180.

Furidha, B. W., Pratiwi, T. I., & Rahmawati, N. (2023). Comprehension of the descriptive qualitative research design: A methodological review. *Journal of Multidisciplinary Research, 2*(3), 45–56.

Ganajová, M., Orosová, R., Sotáková, I., & Letošníková, P. (2025). The effect of inquiry-based teaching on students' attitudes toward science as an academic subject as well as science and technology in general. *Frontiers in Education, 10*, 1708139. https://doi.org/10.3389/feduc.2025.1708139

Guido, J. M. (2018). Conceptual understanding and student motivation in physics education. *European Journal of Physics Education, 9*(3), 45–61.

Hanifah, A., Sudibyo, E., Munasir, & Budiyanto, M. (2023). Contextual-based physics learning through experimental method to increase learning outcomes in thermodynamics material. *Studies in Learning and Teaching, 4*(2), 250–259. https://doi.org/10.46627/silet.v4i2.206

Hwang, G.-J., Tsai, C.-C., Chu, H.-C., Kinshuk, & Chen, C.-Y. (2012). A context-aware ubiquitous learning approach to conducting scientific inquiry activities in a science park. *Australasian Journal of Educational Technology, 28*(5), 931–947.

Irawati, E., Wati, M., Khairunnisa, Y., Mahtari, S., & Ulfah, M. (2025). The role of problem-based learning model in enhancing students' motivation and physics academic achievement. *KnE Social Sciences, 10*(11), 37–48. https://doi.org/10.18502/kss.v10i11.18731

Kotsis, K. (2024). The significance of experiments in inquiry-based science teaching. *European Journal of Education and Pedagogy, 5*(2), 30815.

LabWale. (2024). *Science park: Promoting STEM education through interactive learning*. LabWale Teaching Resources.

Mirjaz, N. N., & Abioso, W. S. (2023). Desain museum sains dan teknologi di Bandung sebagai ruang eksplorasi interaktif berbasis teknologi. *DESA: Jurnal Desain dan Arsitektur, 4*(2), 78–95.

Nolen, S. B. (2003). Learning environment, motivation, and achievement in high school science. *Journal of Research in Science Teaching, 40*(4), 347–368.

Nurjayanti, N., Ratma, J., & Rahman, F. (2025). A descriptive analysis of students' learning motivation in online English classes. *Journal of English Language Education, 10*(1), 34–49.

Pečiuliauskienė, P. (2023). Instructional clarity in physics lessons: Students' motivation and self-confidence. *Cogent Education, 10*(1), 2236463. https://doi.org/10.1080/2331186X.2023.2236463

Purnomo, H., Nugraha, F. F., & Rahayu, G. D. S. (2021). The effect of the hands on activity learning model on science process skills in elementary school students. *Journal of Elementary Education, 5*(2), 210–214.

Purushotama, N. B. S. A., & Nainggolan, J. D. L. (2025). The association between smartphone addiction, learning motivation levels, and cumulative grade point average among students at the Faculty of Medicine, Pelita Harapan University. *Medicinus, 14*(2), 141–149.

Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health, 23*(4), 334–340.

Vol.2, No.2 (December – 2025)
E-ISSN: 3063-8704
pp.89-95

Sari, N. (2017). Senior high school learning motivation on physics subject. *Jurnal Pendidikan dan Pembelajaran, 24*(1), 1–5.

Sari, S. A., & Oransa, M. A. (2025). Qualitative analysis of the implementation of inquiry-based physics learning tools on strengthening character and improving learning outcomes. *Schrödinger: Journal of Physics Education, 6*(1), 34–42. https://doi.org/10.37251/sjpe.v6i1.1469

Setiaji, B., Wiyatmo, Y., Diyana, T. N., Pujianto, P., Gustama, M. W., Vidaroini, S., ... & Bunma, C. (2024). An analysis of physics learning motivation using a case study-based learning motivation assessment instrument. *Jurnal Inovasi Pendidikan IPA, 10*(2), 111–119.

Sianturi, M. E. (2024). Development magnetic science park props based on science literacy to improve understanding concept of magnetic force in grade IV elementary school. *Phenomenon: Jurnal Pendidikan MIPA, 13*(2), 245–263.

Sukmawati, S. (2022). High school students' motivation towards physics learning based on ARCS learning model during COVID-19 outbreak. *International Journal of STEM Education for Sustainability, 2*(1), 105–132. https://doi.org/10.53889/ijses.v2i1.15

Suswandi, T. N., & Ripandi, S. (2024). The impact of smartphone restrictions on elementary school students' interest in learning. *Indonesian Journal of Innovative Teaching and Learning, 1*(2), 1–11. https://doi.org/10.64420/ijitl.v1i2.196

Teplá, M., & Distler, P. (2025). The impact of long-term inquiry-based science education on students' motivation and knowledge acquisition. *Humanities and Social Sciences Communications, 12*, 239.

Wood, R. (2019). Students' motivation to engage with science learning activities through the lens of self-determination theory: Results from a single-case school-based study. *Eurasia Journal of Mathematics, Science and Technology Education, 15*(7), em1718.

Yılmaz, M. M., Bekirler, A., & Dikici Sigirtmac, A. (2024). Inspiring an early passion for science: The impact of hands-on activities on children's motivation. *ECNU Review of Education, 7*(4), 1031–1049.

Yusrizal, Y., & Hanif, H. (2017). Increasing of students' motivation in learning physics through the use of computer simulation media viewed from parents' employment background. *Jurnal Ilmiah Peuradeun, 5*(2), 201–212.