Bubungan Tinggi: Jurnal Pengabdian Masyarakat
http://ppjp.ulm.ac.id/journals/index.php/btj/index
e-ISSN: 2722-3043 p-ISSN: 2722-2934
Vol 8 No 2 2026
DOI: https://doi.org/10.20527/btjpm.v8i2.18265

Implementating STEM Coding in Science Learning to Support Students' Digital Literacy Skills

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Article Info

Article history:
Received: February 5, 2026
Accepted: March 24, 2026
Published: May 28, 2026

Keywords:
Digital literacy
Science education
Participatory action research
STEM-Coding

Abstract

Science teaching at the school was identified as traditional, with little or no use of digital tools and low levels of digital literacy. The purpose of this program was to support students' digital literacy skills at one of the junior high schools in Indralaya, Ogan Ilir, by using a STEM-coding approach that connected science concepts with coding as a medium for learning. The intervention followed a Participatory Action Research (PAR) approach, emphasizing collaborative planning, action, observation, and reflection. Sixteen students (10 females and 6 males) in grades VII–IX participated in the program. The intervention's effectiveness was measured through a digital literacy assessment featuring ten indicators. Results show all participants scored in the high category on the post-intervention instrument. Students were more confident using digital tools to present and explore scientific concepts. Thus, it demonstrates that the STEM-coding approach is an effective model for strengthening digital literacy and can be replicated and adapted into the curriculum.

To cite this article: Saparini, S., Andriani, N., Supardi, S., Amri, I., Ananda, D., & Kurnia, D. I. (2026). Implementating stem coding in science learning to support students' digital literacy skills. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat, 8*(2), 366-376.

INTRODUCTION

Science education is fundamental in equipping students to comprehend natural phenomena and make informed choices in a world increasingly shaped by technology (Ahzan et al., 2024; Morris, 2025; Saparini et al., 2019). Nowadays, scientific literacy is closely linked to digital literacy in the 21st century, as students are required not only to comprehend scientific ideas but also to use technology resources to explore, analyze, and solve authentic situations. (Dašić et al., 2024; Yang et al., 2023). Despite the growth of connections, many schools struggle to create learning contexts that enable students to develop digital literacy through science classes (Nowell, 2014; Temirkhanova et al., 2024). In Indonesia, efforts to implement technology in science education remain unsatisfactory. The technology integration is still below expectations, especially at junior high schools (Calvin et al., 2023; Kurdiati et al., 2025). Science classes continue to be dominated by the teacher, with an emphasis on theoretical rather than practical inquiry, technology-mediated exploration, and digital problem-solving exercises. Such limitations are often attributed to a lack of technology access, low digital skills among teachers, and the absence of programs that integrate digital literacy in science education. Thus, digital content and web resources are contributing to the fragmented development of scientific literacy in students, which is rarely mediated within inquiry processes.

Despite its importance, the integration of digital technology into science education remains a challenge in many schools. Teachers often face limitations in technological infrastructure and insufficient pedagogical strategies to effectively incorporate digital tools into science learning. As a result, science instruction is still frequently dominated by conventional approaches that emphasize theoretical explanations rather than interactive and technology-based learning experiences. This condition may hinder students from developing higher-order thinking skills and digital competencies that are increasingly required in modern education.

Moreover, empirical evidence regarding integrating STEM and coding activities to support digital literacy in science education remains relatively limited. According to the needs assessment conducted by the community service team at the partner school in Indralaya, both teachers and students have difficulty effectively using digital media in science education. Teachers reported that they are not confident and lack experience in designing technology-based lesson plans and that students have very little experience with coding or digital modeling activities in science. There were also no systematic, modular, or structured activities conducive to the use of digital tools while stimulating conceptual insight in the school. These results revealed the necessity for an intervention that can effectively support the application of digital literacy in science learning. Meanwhile, the STEM (Science, Technology, Engineering, and Mathematics) method empowers students to discover scientific ideas through programming simulations, digital models, and interactive experiments (Anggraini & Huzaifah, 2017; García-Carrillo et al., 2021; Utami & Wilujeng, 2020). Moreover, a model program for STEM coding using mentoring has yielded improved collaboration skills, creativity, and digital literacy in students through experiential learning (Ismet et al., 2022; Maharani et al., 2024). Therefore, one approach to addressing the school's challenges is to integrate STEM (Science, Technology, Engineering, and Mathematics) subjects with coding.

Based on the aforementioned considerations, this community service was designed to support the students’ digital literacy through science learning processes involving a STEM-Coding-based approach in one of the classes at the partner school (one of the junior high schools) in Indralaya. The program encourages participation, teamwork, and hands-on coding to investigate science. It also aims to enhance teachers’ ability to provide an instructional module using sustainable digital instruction. Additionally, it develops sustainable digital learning media that align with the school’s curriculum. These efforts aim to create a more engaging, inquiry-based learning environment that boosts students’ critical thinking, problem-solving skills, and responsible digital use of technology.

According to the challenges explained by the partner school, the community service program was designed to support students’ digital literacy through science learning activities integrating a STEM-Coding-based approach in one class at a partner junior high school in Indralaya. The program emphasizes active participation, collaboration, and hands-on coding to support inquiry-based science learning. Students were involved in structured learning cycles that included problem identification, formulation, experimentation, and simple programming tasks. Collaborative group work is employed to encourage peer discussion, knowledge sharing, and collective problem-solving. Coding activities, such as algorithm design, logical sequencing, and basic simulation, serve as a way to turn abstract scientific ideas into clear, tangible digital forms, making complex concepts more accessible and engaging representations. Thus, through this process, students gained important skills in digital literacy, such as how to process information, think computationally, and use technology responsibly. All within a real and meaningful science learning environment.

METHODS

This community service program used a Participatory Action Research (PAR) framework with four recurring stages: planning, action, observation, and reflection. This method facilitated collaborative problem-solving with teachers, the execution of STEM-coding activities, tracking student engagement, and evaluating the learning process through reflection. The PAR framework ensured that the intervention was contextually relevant and responsive to the needs of students. It highlighted hands-on experience, students were directly involved in coding tasks that embedded science. The implementation itself is a multi-phase process, beginning with a needs assessment, continuing through STEM coding basics training and media deployment to mentorship, and culminating in in-program follow-up. Each stage aimed to develop students' digital ability, problem-solving, and scientific reasoning through a series of project-based tasks. It was carried out in the partner school Indralaya, Ogan Ilir Regency, South Sumatra, along with the school management, which was responsible for selecting participants and managing the schedule.

The participants in this program were 16 students from grades VII to IX of the junior high school. The distribution of participants included six students from grade VII, four students from grade VIII, and six students from grade IX. By gender, the participant group consisted of 10 females and 6 males. The students were selected through a nomination process conducted by the science subject teachers, based on their learning motivation, interest in science and technology, and readiness to engage in digital-based learning. All student participants completed the entire activity (training, coding-based science experiments, and reflection sessions). Along with the students, several science teachers were among the program's prime beneficiaries. Their involvement centers on enhancing their pedagogical capability and digital literacy through training, mentoring, and joint implementation of the STEM-Coding approach in science learning. These teachers were able to support classroom practice and set the scene for what should happen next time in successive activities related to the program.

Design Activity

The design of this community service program integrated five systematic stages: Socialization, Training, Technology Integration, Mentoring and Reflection, and Program Perpetuation. Each step was designed to help teachers and students build pedagogical digital literacy with the implementation of the STEM-Coding approach in science learning. The exercises were facilitated by a number of digital media and teaching aids to facilitate both content delivery and interactive learning. A detailed overview of the activity stages is presented in Table 1.

Table 1. Stages of activity

Stages	Schedule	Activities Description	Equipment
Planning (needs assessment and socialization)	June 2025	• Conducted preliminary observations to identify challenges in science learning and technology integration at SMP Negeri 1 Indralaya. • Discussed with science teachers to formulate needs-based learning media design.	Observation sheets, interview guides, discussion notes, a laptop, and a documentation camera

Stages	Schedule	Activities Description	Equipment
		• Designed the integration of physics concepts with STEM and coding to facilitate contextual learning.	
Action (training)	September 2025	• Led coding sessions incorporating STEM components to enhance science learning. • Assisted students in understanding coding media. • Conducted interactive sessions focused on simple coding simulations aligned with science topics.	Laptops, projector, internet connection, STEM-Coding learning module, coding software
Action (technology implementation)	October - November 2025	• Integrated shared resources of specially designed STEM-coding media. • Monitoring of student engagement, collaboration, and comprehension in coding-enhanced science learning. • Conducted feedback and reflections with students on media and instructional strategies.	Classroom computers, coding applications, observation rubrics, cameras, and feedback forms
Mentoring and Reflection	November 2025	• Mentor students in understanding the topic aligned with the learning objectives effectively. • Engaged students in reflection on lessons learned with discussion and brief assessments. • Gathered observations of classroom dynamics	Mentoring guides, reflection sheets, discussion notes, and evaluation forms

Data Analysis

Data analysis for this community service program focused on evaluating the implementation of the STEM-coding approach in supporting students' digital literacy. The deployment of the community service program commenced with the number of instruments. The collected data consisted of observation notes, student responses during activities, and results from a final digital literacy assessment. The observation focused on student engagement, collaboration skills, accuracy in executing coding instructions, and active participation in discussions. The combination of quantitative and qualitative data offers a thorough view of how effective the STEM-coding approach is in enhancing students' digital literacy and critical thinking skills.

Furthermore, this assessment was a questionnaire with ten closed-ended questions designed to evaluate students' skills in searching, processing, analyzing, and responsibly managing digital information in scientific learning contexts. Quantitative data from the digital literacy test were analyzed using descriptive statistics, including minimum, maximum, and average scores, as well as the frequency distribution of ability levels (Harmawati et al., 2024). These levels were categorized based on score ranges: very low (0–21), low (21–40), moderate (41–60), high (61–80), and very high (81–100). Success indicators were defined as at least 80% of participants achieving high-level digital literacy scores (61–100) and active participation during coding-based activities. Additionally, ethical approval for this community service activity was secured from the partner school. Student participation was voluntary, with permission from the school and teachers. Responses were anonymized to ensure data confidentiality.

RESULTS AND DISCUSSION

Planning (Needs Assessment and Socialization)

The program began with a needs assessment and socialization stage. The deployment of the community service program commenced through socialization and preliminary observation at the partner school as an initial activity to collect information. At this point, the service team did the groundwork for a direct observation of the general learning environment and possible problems experienced by science students. The study revealed that the orientation was largely traditional, with little focus on integrating technology-based instruction. Notable difficulties include limited digital resources (such as simulation programs and experimental equipment) and low digital literacy among students. The results show that many teachers experience difficulties integrating technology into science learning, so teaching practices tend to remain traditional, inhibiting students' development of a deeper understanding of concepts.

With this in mind, the service team collaborated with science students to develop new kinds of learning media. This framework integrates physics, STEM practices, and coding elements to develop students' critical thinking and problem-solving skills. This cooperation allowed the service team and teachers to share an understanding of the program's purposes and work out a feasible plan for implementing STEM-coding learning media, which could meet students' requirements. By the end of this phase, the school community had a clear overview of upcoming activities, a contextual framework for media development, and a basis for ongoing collaboration.

Action (Training and Implementation Technology)

The training stage aimed to deepen students' understanding of STEM coding and teach practical applications in science education. It focused on connecting science concepts with digital tools, making learning more interactive, relevant, and engaging. The workshop included two sessions that combined theoretical understanding with hands-on practice.

During the initial session, the service team explained the fundamental principles of STEM education and demonstrated how coding can be integrated into physics lessons to illustrate concepts such as motion, electricity, and energy transfer. Teachers were encouraged to identify opportunities where coding simulations could boost students' inquiry and experimentation skills. Participants also examined samples of digital learning media that promote active learning in science. As shown in Figure 1, the team offered teachers a detailed overview of the design and pedagogical application of STEM-coding media.

Figure 1 The team in action during a training session

This was followed by a second session of experiential learning in which students collaborated to create basic simulations using user-friendly tools. This 'hands-on' activity assisted students in learning how to translate their scientific understanding into visual representations using coding, and teachers acted as facilitators of learning so that the content remained curriculum-informed. Figure 2 is a response from students who, under the guidance of the service team, became makers of STEM coding media, indicating their engagement and growing interest in digital science learning.

Figure 2 Students practiced developing coding-based media during the workshop

This stage promoted collaboration among the service team, teachers, and students in designing and implementing technology-supported learning media. The activities showed that with proper facilitation of digital literacy, students can participate more actively and creatively in inquiry-based science learning.

Following the training stage, students in the partner school in Indralaya began to implement collaboratively developed STEM-coding media during real classroom practices. This level focused on the application of media-coded resources for practical purposes, helping students understand science concepts by simulating and experimenting with various things. In practice, the team supported learning while students used their generated media to investigate science phenomena interactively. This work allowed students to connect coding commands to science concepts, making other abstract ideas, such as motion, force, and electricity, more concrete. Figure 3 Students interacting with STEM-coding media in the classroom with the team. This level effectively engaged students in producing and utilizing technology-supported learning media. The activities provided evidence that when students are well-supported in developing digital literacy, they can participate actively and generatively in inquiry-based science learning.

Figure 4 Students used STEM-coding media in the classroom during implementation activities

The classroom environment grew more lively and engaging as students collaborated, exchanged ideas, and reflected on their findings during simulation activities. Educators reported that the STEM-Coding media helped students visualize science content and engage in inquiry-based discussions. Throughout this phase, students were observed by the service team, who gathered feedback and wrote reflections. These findings contributed to enhancing the development and instructional implementation of the STEM-Coding media by making it more realistic and flexible for future classroom introduction.

Mentoring and Reflection

The mentoring and reflection phase was designed to support students in the application of STEM-coding media within real classroom settings and to reflect upon their learning. Service team members led a series of mentoring meetings focused on teaching participants how to link coding-based media to science content. These sessions combined lesson observation, guided discussion, and feedback on coding media produced during the earlier workshops. During this phase, the service team also provided a brief survey to measure students' comprehension of digital literacy through the STEM-coding learning environment. A questionnaire composed of ten closed questions was designed to assess searching, analyzing, and responsible use of digital information skills among students in learning science. As shown in Table 2, most students scored high-level to perfect scores on digital literacy, meaning they were well prepared to ethically and effectively use the digital tools for science education activities.

Table 2 Frequency distribution of digital literacy scores

Category	Score	Frequency	Percentage
Very low	0–20	0	0%
Low	21-40	0	0%
Moderate	41–60	0	0%
High	61-80	2	12.5%
Very high	81–100	14	87.5%
Total		**16**	**100%**

Based on the data processing of students' digital literacy scores, all participants were classified in the high category. No students fell into the medium or low categories. The average final score was 92.5, ranging from 61 to 100, demonstrating that all students excelled in digital literacy concepts. These results indicate that students demonstrated strong digital literacy performance after participating in the STEM-coding learning activities. Integrating STEM with coding activities leads children not only to conceptualize through science and technology but also to become capable of using digital technology to solve scientific problems.

Moreover, through direct observation, several important classroom dynamics were identified. Grade 9 students appeared more active during practical sessions, as they had prior coding experience through an extracurricular program focused on HTML. However, over time, Grade 7 students gradually adapted and were able to follow the coding activities effectively. Interestingly, a group of female students worked collaboratively in a single team and demonstrated skills comparable to their male peers, highlighting equitable participation and capability in STEM coding activities.

In addition, mentoring experience promoted reflection among students. Teachers were assisted in matching coding experiments to the science curriculum, and students reflected on how simulating events through coding helped them develop a better understanding of physical and environmental causes. Discussion within groups revealed that students felt more motivated and confident when participating in hands-on, coding-based experiments. Collaborative mentoring supported the development of coding-centered learning media and developed digital literacies to question, create, and enable responsible use of technology in science education.

The implementation of the STEM-Coding program at the partner school in Indralaya demonstrated several key outcomes regarding student engagement in science learning. Observations and mentoring revealed that students were more engaged in experimenting with physical phenomena. They demonstrated enhanced problem-solving and critical thinking abilities in coding-based simulations. The collaborative design process helped students grasp the topic aligned with the learning objectives. These findings indicate that integrating STEM and coding practices through the SMP curriculum supports interactive learning, promotes better conceptual understanding, and aids junior high school students in developing their digital literacy level.

These activities are in alignment with other research studies that have advocated the positive effects of technology integration (i.e., STEM and digital tools) in science education. The results of this program show that coding-based learning tools will improve students' problem-solving. Teachers led STEM activities in which digital media are used among students, and that help to better focus their attention, leaving them more engaged and motivated for learning and increasing their creativity when tasks are related to real-life (Saparini et al., 2021). Simultaneously, the process by which learners and facilitators engage in team-based science, technology, engineering, and mathematics (STEM) learning communities will stimulate their higher-order thinking and 21st-century skills (Ali, 2024; Wiyono et al., 2022). The mentorship and reflection stages of the program underscored the importance of ongoing support in the use of digital learning resources. The students' positive perceptions align with the fact that regular feedback and collaborative support are essential for integrating technology into classrooms. In addition, the development of a teacher learning community also aligns with teacher learning and peer mentoring, which are crucial to maintaining innovation in teaching.

Through linking program outcomes with literature, it is evident that STEM-Coding programs in context have provided support to both student learning and teacher capacity when using technology in meaningful ways (Wiyono et al., 2020). According to the observation, design, and training, combined with reflection activities, it offers an example of how STEM could be organized in science education. Overall, the findings of this paper show that guided support and collaboration can positively affect student engagement, conceptual understanding, and digital literacy, which is in line with previous trends found in STEM pedagogy as described by recent research on digital learning.

CONCLUSION

Implementing STEM-Coding activities in science classes at the partner school in Indralaya successfully supported students’ engagement and led to high digital literacy scores (M = 92.5). It indicates high levels of skill in using digital tools, problem-solving, and conceptual understanding. The program helped teachers gain experience with innovative teaching strategies in integrating coding-based learning media into the classroom. For future programs, it is recommended to involve a larger sample in the long term, which may obtain the long-term effect of the integration of STEM coding on students’ digital literacy. Besides, schools are advised to implement ongoing professional development for teachers to maintain and enhance technology-driven teaching methods.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Forming a team, S.; formulating objectives and identifying stakeholders, N.A.; training on assessment instrument development, S.; evaluating the community service, I.A.; analyzing needs, D.A., and D.I.K.; preparing for community service. All authors have read and agreed to the published version of the manuscript.

AI DISCLOSURE STATEMENT

The author used Grammarly during the preparation of this work for checking grammar and improving the quality of English writing. After using the tool/service, the author thoroughly reviewed and edited the content as needed and takes full responsibility for the content of the publication. The authors declare that this research was prepared, researched, written, and edited without the aid of artificial intelligence (AI) techniques.

ACKNOWLEDGMENTS

The authors would like to thank the Institute for Research and Community Service (LP2M) of Sriwijaya University with Contract No. 0024/UN9/SB3. LPPM.PM/2025, which has provided financial support for this program.

REFERENCES

Ahzan, S., Prayogi, S., Azmi, I., & Samsuri, T. (2024). Technology-based future science education : Axiological philosophy in the framework of bibliometric analysis. *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, *12*(1), 267–274.

Ali, R. Al. (2024). Enhancing 21st century skills through integrated stem education using project-oriented problem-based learning. *Geojournal of Tourism and Geosites*, *53*(2), 421–430. https://doi.org/10.30892/gtg.53205-1217

Anggraini, F. I., & Huzaifah, S. (2017). Implementasi stem dalam pembelajaran ipa di sekolah menengah pertama. *Program Studi Pendidikan Biologi Fakultas Keguruan Dan Ilmu Pendidikan Universitas Sriwijaya*, *1*(1), 722–731.

Calvin, Y., Kurniawan, D., Januardi, J. I., Paramitha, N. G., Tanore, J. A., & Dewani, M. S. (2023). Issues and challenges of technology use in indonesian schools: Implications for teaching and learning. *International Journal of Indonesian Education and Teaching*, *7*(2), 221–233.

Dašić, D., Kostadinović, M. I., Vlajković, M., & Pavlović, M. (2024). Digital literacy in the service of science and scientific knowledge. *International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE)*, *12*(1), 219–227.

García-Carrillo, C., Greca, I. M., & Fernández-Hawrylak, M. (2021). Teacher perspectives on teaching the STEM approach to educational coding and robotics in primary education. *Education Sciences*, *11*(2), 1–16. https://doi.org/10.3390/educsci11020064

Harmawati, Y., Sapriya, Abdulkarim, A., Bestari, P., & Sari, B. I. (2024). Data of digital literacy level measurement of Indonesian students: Based on the components of ability to use media, advanced use of digital media, managing digital learning platforms, and ethics and safety in the use of digital media. *Data in Brief*, *54*, 110397. https://doi.org/10.1016/j.dib.2024.110397

Ismet, I., Edi, R., Haryani, M. E., & Saparini, S. (2022). Pendampingan pembuatan e-modul untuk meningkatkan keterampilan literasi digital bagi guru mgmp ipa kota pagaralam. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, *4*(4), 1638–1646.

Kurdiati, L. A., Apriana, R., & Saparini, S. (2025). Transformation of sustainability science education : Pisa 2025 science framework and esd on e-worksheets science in the context of the role of peatland in global warming phenomenon. *Kasuari: Physics Education Journal (KPEJ)*, *7*(2), 431–445.

Maharani, S. D., Inderawati, R., Santri, D. J., Dasar, G. S., & Sriwijaya, U. (2024). Developing teachers digital competence international stem coding training. *Unram Journal of Community Service*, *5*(4), 330–334. https://doi.org/10.29303/ujcs.v5i4.746

Morris, D. L. (2025). Rethinking science education practices : Shifting from investigation-centric to comprehensive inquiry-based instruction. *Education Sciences*, *15*(1), 1–18.

Nowell, S. D. (2014). Using disruptive technologies to make digital connections: stories of media use and digital literacy in secondary classrooms. *Educational Media International*, *51*(2), 109–123.

Saparini, Andriani, N., & Pasaribu, A. (2019). Analisis keterampilan proses sains mahasiswa pada mata kuliah praktikum fisika dasar. *Kasuari: Physics Education Journal (KPEJ) Universitas Papua*, *2*(1), 1–10.

Saparini, S., M. Misbah, & W. R. Rizaldi. (2021). Understanding the prospective physics teachers conception of the characteristic of sound Understanding the prospective physics teachers conception of the characteristic of sound. *Journal of Physics: Conference Series PAPER*. https://doi.org/10.1088/1742-6596/1760/1/012030

Temirkhanova, M., Abildinova, G., & Karaca, C. (2024). Enhancing digital literacy skills among teachers for effective integration of computer science and design education : a case study at Astana International. *Frontiers in Education*, *9*. https://doi.org/10.3389/feduc.2024.1408512

Utami, V. B., & Wilujeng, I. (2020). STEM application through simple technology to improve technology literacy. *Journal of Physics: Conference Series*, *1440*(1). https://doi.org/10.1088/1742-6596/1440/1/012050

Wiyono, K., Ismet, I., & Saparini, S. (2020). Development of interactive multimedia for learning physics based on traditional games. *Journal of Physics: Conference Series*, *1480*(1). https://doi.org/10.1088/1742-6596/1480/1/012074

Wiyono, K., Sury, K., Hidayah, R. N., Nazhifah, N., Ismet, I., & Sudirman, S. (2022). Stem-Based E-Learning: implementation and effect on communication and collaboration skills on wave topic. *Jurnal Penelitian & Pengembangan Pendidikan Fisika*, *8*(2), 259–270. https://doi.org/10.21009/1.08208

Yang, C., Hsu, C., Kuo, C., & Du, Z. (2023). The role of digital literacy in augmented , virtual , and mixed reality in popular science education : a review study and an educational framework development. *Virtual Reality*, *27*(3), 2461–2479. https://doi.org/10.1007/s10055-023-00817-9

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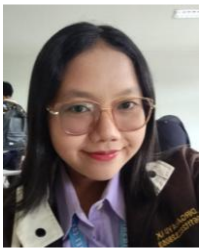

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