

Improving Coding Education with Storytelling Bakisah Bahasa Banjar for Elementary School Teachers

M. Saufi*, Kamariah, and Haswinda Harpriyanti

Universitas PGRI Kalimantan Banjarmasin, Banjarmasin, Indonesia

muhammadsaufi@upk.ac.id

Article Info

Article history:

Received: December 12, 2025

Accepted: April 12, 2026

Published: May 30, 2026

Keywords:

Bakisah bahasa banjar

Scratch

Storytelling

Unplugged coding

This article is licensed under a [Creative Commons Attribution-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/)

© 2026 Bubungan Tinggi: Jurnal Pengabdian Masyarakat

Abstract

Limited access to technological infrastructure and low teacher competency in coding instruction remain key challenges in implementing digital literacy in elementary schools in Banjar Regency. These conditions hinder the integration of computational thinking into classroom practices, particularly in schools with minimal digital resources. Therefore, this Community Service Program aimed to enhance teachers' competencies in teaching coding through a culturally responsive approach as a solution to these challenges. This program adopted a Participatory Action Research (PAR) approach combined with Asset-Based Community Development (ABCD), emphasizing active teacher involvement and the utilization of local cultural assets. The intervention was implemented through three main stages: Unplugged Coding activities, integration of Bakisah Bahasa Banjar storytelling, and Scratch-based digital coding. A total of 22 elementary school teachers from the Ikatan Guru Kelas (IGK) of Banjar Regency participated in the program, followed by four post-training mentoring visits to support sustainable implementation. The results demonstrate significant improvements in three key outcome aspects: (1) increased teacher competency in understanding and applying basic programming concepts, (2) enhanced student learning interest through culturally contextualized coding activities, and (3) successful implementation of culture-based coding practices in classroom settings. In addition, the program established a digital teacher community that supports continuous professional development and sustainability. This program contributes to the development of culturally responsive coding education while promoting the preservation of local wisdom through technology-based learning. It also provides an alternative model for introducing coding in resource-limited educational contexts, fostering students who are both digitally literate and culturally aware.

To cite this article: Saufi, M., Kamariah, K., & Harpriyanti, H. (2026). Improving coding education with storytelling bakisah bahasa banjar for elementary school teachers. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, 8(2), 426-437.

INTRODUCTION

21st-century education demands mastery of academic literacy and digital literacy, which encompasses computational thinking and programming (coding). Coding has become an essential skill to be introduced to students from an early age, as it not only develops their technical abilities but also trains them in logical, critical, and creative thinking for problem-

solving ([Kamariah et al., 2025](#)). This skill, often referred to as computational thinking (CT), involves four main components: problem decomposition, pattern recognition, information abstraction, and algorithm development ([Wing, 2006](#)). However, despite coding being an important skill, access to technology in many regions of Indonesia, particularly in remote areas like Banjar Regency, remains limited ([Lye & Koh, 2014](#)). Not all elementary schools have adequate infrastructure, such as computers or stable internet connections.

To address this issue, Unplugged Coding proves an effective solution. Unplugged coding is a teaching method that introduces fundamental coding concepts without computers ([Kamariah & Saufi, 2025](#)). This approach utilizes physical tools and games that can be accessed by all schools, regardless of technological availability ([Chen et al., 2023](#)). Unplugged coding has been shown to enhance students' computational thinking skills without requiring hardware, making it an ideal alternative to overcome technological limitations in some areas ([Kamariah & Jaidie, 2025](#)).

Moreover, the integration of storytelling in coding education, particularly based on local culture such as Bakisah Banjar, represents an innovative step in creating more contextual and meaningful learning for students. *Bakisah Banjar* is an oral tradition long established in South Kalimantan, rich in moral values and local wisdom. Integrating these folk stories into coding education not only enhances students' understanding of programming concepts but also preserves local culture, which is increasingly being forgotten due to the progress of modern technology ([Kordaki & Kafakas, 2017](#)). Thus, storytelling can enrich students' learning experiences, making it more relevant and enjoyable ([Papadakis et al., 2016](#)).

One of the main challenges faced by elementary school teachers in Banjar Regency is limited competence in teaching coding, particularly due to inadequate access to digital infrastructure and a lack of contextual learning approaches. Many teachers are still unfamiliar with computational thinking concepts and how to integrate them into classroom instruction, resulting in minimal exposure of students to coding education. In addition, existing teaching practices often rely on conventional methods that do not connect learning to students' cultural backgrounds, making the learning process less meaningful and engaging.

To address these challenges, this community service program offers a training-based solution to enhance teachers' competencies in coding instruction through a culturally responsive approach. The program trained 22 elementary school teachers to implement coding learning using unplugged coding and storytelling based on Bakisah Bahasa Banjar. This approach enables teachers to introduce fundamental programming concepts through simple, interactive, and accessible methods without relying on advanced digital devices ([Resnick et al., 2009](#)). Furthermore, the program introduced Scratch as a visual programming tool that facilitates interactive and creative learning, allowing students to develop animations and stories rooted in local culture ([Kamariah et al., 2025](#)).

The use of Scratch as a tool in teaching coding further facilitates students' understanding of programming logic through an easy-to-understand and enjoyable interface ([Resnick et al., 2022](#)). By combining the Unplugged Coding method and Scratch, we aim to ensure that coding education can be implemented in various school conditions, both those with complete technological devices and those with limited access ([Brennan & Resnick, 2012](#)). Through this program, several targeted outcomes are expected to be achieved. First, there will be a measurable improvement in teachers' digital literacy and competency in teaching coding, particularly in applying computational thinking concepts in classroom practices. Second, implementing culture-based learning is expected to enhance student engagement by integrating local wisdom, specifically Bakisah Bahasa Banjar, into coding instruction. Third, the program aims to produce sustainable classroom practices supported by a

collaborative digital teacher community that facilitates continuous professional development. In the long term, this program is expected to contribute to the development of an innovative and culturally responsive learning model that integrates technology and local wisdom. Such an approach not only strengthens students' digital skills but also fosters cultural awareness, thereby supporting the creation of a generation that is both technologically competent and rooted in their cultural identity.

METHODS

This community service program employed a Participatory Action Research (PAR) approach combined with the principles of Asset-Based Community Development (ABCD). The PAR approach was selected because the program positioned elementary school teachers not merely as training recipients but as active agents of pedagogical transformation. Through cycles of collaborative planning, action, observation, and reflection, teachers were directly involved in designing, implementing, and evaluating culturally responsive coding instruction ([Huffman & Soller, 2020](#)). Meanwhile, the ABCD framework emphasized identifying and maximizing existing local assets, particularly Banjar cultural narratives, teacher networks, and school learning environments, as foundational resources for educational innovation. The integration of local cultural elements and storytelling as pedagogical resources is also supported by previous studies highlighting their effectiveness in enhancing computational thinking and meaningful learning experiences ([Gurney & Aslan, 2021](#); [Kordaki & Kafakas, 2017](#)).

Participatory Planning and Initial Coordination

The first stage involved participatory planning through socialization and coordination meetings with the Asosiasi Guru Kelas Kabupaten Banjar (AGK Kab. Banjar), or the elementary school teacher association in Banjar Regency. This stage aimed to establish mutual understanding regarding the program objectives, implementation schedule, and expected outcomes. Within the PAR framework, this phase served as a collaborative problem-identification and joint program-design phase, ensuring that teachers' needs and contextual challenges were considered in shaping the training activities. During this stage, several preparatory actions were conducted, including:

1. mapping teachers' initial competencies and needs in coding education;
2. identifying relevant local cultural assets such as Banjar folklore;
3. developing training modules and instructional media (Kids First Coding & Robotics and Scratch);
4. finalizing the activity timeline and implementation procedures.

This participatory planning ensured that the program was grounded in local realities and aligned with teachers' professional development needs.

Action Phase: Workshop Implementation

The action phase represented the core implementation of the program and was conducted through three structured workshops. This stage corresponds to the "action" component of the PAR cycle, where collaboratively designed strategies were implemented in practice. Each workshop was designed progressively, moving from conceptual understanding to contextual integration and finally to digital application.

a. Workshop 1: Basic Unplugged Coding Training Using Kids First Coding & Robotics

The first workshop introduced participants to fundamental coding concepts through unplugged activities that did not require digital devices. Teachers learned core computational thinking elements such as algorithms, sequences, loops, and conditional logic through simulations, physical games, and collaborative problem-solving exercises.

This approach aimed to build foundational understanding in an accessible and engaging manner before transitioning to digital tools. The workshop included:

1. Command simulations and role-playing activities,
2. Group-based problem-solving tasks,
3. Guided reflection sessions to consolidate conceptual understanding.

By minimizing technological barriers, this stage ensured that all participants developed confidence in understanding coding principles.

b. Workshop 2 Integrating Banjar Storytelling (Bakisah Bahasa Banjar) into Coding Education

The second workshop applied ABCD principles by utilizing local cultural narratives as pedagogical assets. Participants were invited to transform Banjar folklore into structured logical sequences that could be translated into basic programming algorithms. This process enabled teachers to connect computational thinking concepts with culturally familiar content, thereby increasing contextual relevance for students. Key activities in this workshop included:

1. selecting Banjar folk stories such as Si Palui or Putri Junjung Buih;
2. breaking down narratives into sequential and logical structures;
3. converting story elements into algorithmic flow patterns;
4. designing lesson plans integrating storytelling and coding.

Through this approach, coding instruction became culturally responsive and more meaningful within the local educational context.

c. Workshop 3: Digital Coding with Scratch and Reflection, Evaluation, and Post-Test

The third workshop introduced participants to Scratch as a visual programming platform for creating animations, interactive stories, and simple games. Teachers practiced arranging code blocks, controlling sprites, designing dialogues, and creating culturally themed digital projects. This stage connected abstract coding logic with tangible digital outputs rooted in Banjar cultural themes.

Following the digital practice session, evaluation and reflection activities were conducted to measure the achievement of the program outcomes, particularly in improving teachers' conceptual understanding and practical coding skills. The evaluation employed a pre-test and post-test design, complemented by reflective discussions and classroom implementation planning. To ensure systematic measurement, the assessment instruments were developed based on key indicators of computational thinking and coding practice. The indicators used in the pre-test and post-test are presented in Table 1.

Table 1 Indicators of pre-test and post-test assessment

No	Indicator	Description	Aspect Measured
1	Understanding of Algorithms	Ability to explain step-by-step problem solving	Conceptual
2	Sequence and Logic	Ability to arrange logical sequences	Conceptual
3	Loop (Repetition)	Ability to identify and apply repetition patterns	Conceptual
4	Conditional Statements	Ability to use "if-then" logic in problem solving	Conceptual
5	Unplugged Coding Application	Ability to implement coding concepts through physical activities	Practical
6	Storytelling Integration	Ability to transform stories into algorithmic structures	Practical
7	Scratch Usage	Ability to create simple projects using Scratch	Practical

In addition to the cognitive assessment, a performance-based evaluation was conducted to measure teachers' practical skills in implementing coding instruction. The scoring rubric is presented in Table 2.

Table 2 Practical skills assessment rubric

Score	Criteria	Description
4 (Excellent)	Highly Competent	Able to independently design and implement coding lessons integrating storytelling and Scratch effectively
3 (Good)	Competent	Able to implement coding concepts with minor guidance
2 (Fair)	Partially Competent	Able to apply basic concepts but still requires significant assistance
1 (Poor)	Not Yet Competent	Unable to apply coding concepts in practice

The results of these assessments were analyzed descriptively to determine the level of improvement between pre-test and post-test scores, as well as to evaluate the effectiveness of the training program. The findings of this evaluation are further discussed in the Results and Discussion section. This evaluation phase ensured that learning outcomes were systematically assessed and that teachers were prepared to apply their skills independently.

Observation and Reflection: Follow-Up School Visits

In alignment with the cyclical nature of PAR, the program continued with four post-training school visits to monitor implementation and provide mentoring support. These visits ensured that the intervention extended beyond workshops and resulted in sustainable classroom practice. The visits also allowed facilitators to observe challenges and provide real-time feedback. The visits were structured as follows:

1. Visit 1: Initial classroom observation of coding implementation,
2. Visit 2: Monitoring integration of storytelling-based coding,
3. Visit 3: Evaluation of students' Scratch projects,
4. Visit 4: Final reflection and documentation of best practices.

This stage reinforced collaborative learning and continuous improvement among teachers.

Publication and Documentation

As part of the reflective and dissemination component of PAR, the program outcomes were documented and prepared for broader publication. The documentation included a cinematic video, a popular article in the Kalimantan Post, and a scientific manuscript. Additionally, selected materials were published on the Universitas PGRI Kalimantan YouTube channel to extend public access to the program's results. This dissemination strategy ensured transparency, academic contribution, and wider community impact.

Program Sustainability Strategy

To ensure long-term sustainability, the program integrated ABCD principles by strengthening community-based structures. The establishment of the AGK-UPK Digital Teacher Community serves as a professional learning network for continuous sharing of best practices. Furthermore, the training modules developed during the program will be submitted for intellectual property rights (IPR) protection to enable wider adaptation across schools in South Kalimantan. Future plans include:

1. Expanding training to other districts,
2. Conducting follow-up advanced workshops,
3. Developing a replication model for culturally based coding education.

By combining participatory action research and asset-based community development, this program moves beyond technical training toward a sustainable, culturally grounded educational transformation.

RESULTS AND DISCUSSION

The Community Service Program conducted by Universitas PGRI Kalimantan in Banjar Regency aimed to enhance elementary school teachers' competencies in teaching coding through a culturally responsive approach. The program consisted of structured training sessions, hands-on practice, and post-training mentoring. To evaluate the effectiveness of the program, both quantitative and qualitative data were collected through pre-test and post-test assessments, observations, and participant reflections.

Improvement in Teachers' Competency in Teaching Coding

The evaluation results indicate a significant improvement in teachers' competencies, particularly in conceptual understanding and practical coding skills. These improvements were measured using pre-test and post-test instruments based on computational thinking indicators and coding implementation abilities (see Table 3).

Table 3 Pre-test and post-test results of teacher competency (n = 22)

Aspect	Pre-test (%)	Post-test (%)	Improvement
Conceptual Understanding (algorithm, sequence, loop, conditional)	45%	85%	+40%
Practical Skills (unplugged coding, storytelling, Scratch)	40%	82%	+42%
Average	42.5%	83.5%	+41%

The data demonstrate a substantial increase in both conceptual and practical competencies. Prior to the training, most participants showed limited understanding of computational thinking concepts. After the intervention, more than 80% of participants were able to explain and apply coding concepts effectively in classroom contexts.

This improvement confirms that the training successfully addressed the main problem faced by teachers, namely the lack of competency in coding instruction. The effectiveness of Unplugged Coding is evident in improving conceptual understanding, as it allows participants to learn abstract concepts through physical and interactive activities. This finding is consistent with [Barrett and Kafai \(2010\)](#) and [Caeli & Yadav \(2020\)](#), who state that unplugged approaches can enhance computational thinking without requiring digital devices. In addition, the structured development of computational thinking aligns with the framework proposed by [Brennan and Resnick \(2012\)](#), emphasizing the importance of conceptual and practical dimensions in coding education.

Integration of Bakisah Banjar Storytelling in Coding Learning

The integration of *Bakisah Bahasa Banjar* storytelling into coding instruction emerged as a key innovation of this program. Teachers were trained to transform local folk narratives into algorithmic structures, enabling students to understand coding concepts through familiar cultural contexts. This approach makes abstract computational thinking concepts more concrete and accessible for elementary learners. To illustrate how storytelling elements were systematically translated into coding concepts, the transformation process is presented in Table 4.

Table 4 Transformation of bakisah banjar storytelling into coding concepts

Story Element	Narrative Example (Si Palui)	Coding Concept	Explanation
Beginning	Si Palui starts his journey	Sequence	Step-by-step instructions
Repetition	Walking through the forest	Loop	Repeated actions
Decision	Choosing the correct path	Conditional	If-then logic
Ending	Reaching destination	Output	Final result

As shown in Table 4, elements of storytelling can be systematically mapped into fundamental coding concepts, allowing students to understand programming logic through familiar narrative structures. This transformation supports the development of computational thinking by connecting abstract concepts with contextual and meaningful learning experiences. Consequently, storytelling not only enhances conceptual understanding but also facilitates student engagement in coding activities.

This approach significantly increased student engagement and motivation to learn during coding activities. Students were able to identify coding elements such as sequences, loops, and conditional logic through storytelling-based tasks. For instance, in the story of *Si Palui*, students translated narrative events into structured logical steps, which helped them better understand algorithmic thinking.

These findings are supported by previous studies showing that storytelling enhances coding literacy by providing meaningful and engaging learning contexts ([Gurney & Aslan, 2021](#)). Similarly, digital storytelling has been proven effective in strengthening computational thinking through contextual learning experiences ([Kordaki & Kafakas, 2017](#)). Furthermore, integrating local wisdom into learning contributes not only to cognitive development but also to cultural preservation ([Kamariah et al., 2025](#)). However, several challenges were identified, particularly related to cultural diversity among students. Not all students were equally familiar with Banjar folklore, which affected their initial understanding of the stories used in instruction. Therefore, teachers need to apply adaptive and inclusive strategies by selecting or modifying stories to suit diverse student backgrounds.

Implementation of Scratch in Coding Education

The use of Scratch as a visual programming tool significantly improved teachers' practical skills in coding instruction. Participants were able to create simple animations, interactive stories, and digital learning media based on local cultural themes. This indicates that Scratch provides an accessible platform for teachers to translate abstract coding concepts into concrete digital products.

The results show a 42% increase in practical skills, indicating that teachers successfully transformed conceptual knowledge into real classroom practice. This improvement demonstrates that the training not only enhanced understanding but also strengthened the ability to apply coding in instructional contexts. To provide a more detailed description of the improvement in practical skills, the indicators of teachers' performance using Scratch are presented in Table 5.

As shown in Table 5, teachers demonstrated notable improvements across various practical indicators, particularly in creating interactive learning media and applying block-based programming logic. These results indicate that Scratch not only enhances technical skills but also supports pedagogical innovation in classroom instruction. The improvement in these indicators confirms that teachers effectively translated conceptual knowledge into practical teaching applications.

Table 5 Improvement of teachers' practical skills using scratch

Indicator	Before Training	After Training	Description
Creating simple animations	Limited	Able	Teachers can create basic animated scenes
Designing interactive stories	Not able	Able	Teachers integrate storytelling into Scratch
Using coding blocks (motion, control)	Basic	Proficient	Teachers understand block-based logic
Developing learning media	Minimal	Developed	Teachers create teaching materials
Student-centered activities	Low	High	Learning becomes interactive

These findings are consistent with [Resnick et al. \(2009\)](#), who emphasize that Scratch enables learners to engage in creative computing and develop programming skills in an accessible manner. In addition, the use of Scratch in educational settings has been shown to enhance student engagement and problem-solving abilities ([Papadakis et al., 2016](#)). Therefore, Scratch can be considered an effective tool for supporting both conceptual and practical aspects of coding education.

Despite these positive outcomes, several challenges related to technological infrastructure remain evident. Some schools experienced limitations in device availability and unstable internet access, which constrained the implementation of digital coding activities. These findings suggest the need for institutional support and infrastructure improvement to ensure equitable access to technology-based learning.

Post-Training Support and Classroom Implementation

The mentoring phase, conducted over four school visits, played a crucial role in ensuring the program's sustainability. During these visits, teachers demonstrated their ability to implement coding instruction using Unplugged Coding, storytelling, and Scratch in real classroom settings. This indicates that the training outcomes were successfully transferred into practical teaching practices.

Observations revealed that students actively participated in learning activities and created simple coding-based projects. Teachers also developed lesson plans that integrated coding with local cultural content, reflecting their improved pedagogical competence. To provide a clearer description of the observed outcomes during the mentoring phase, the classroom observation results are summarized in Table 6.

Table 6 Results of classroom implementation during mentoring phase

Aspect Observed	Before Program	After Program	Description
Teacher ability in coding instruction	Low	Improved	Teachers can apply coding concepts
Use of learning methods	Conventional	Interactive	Use of unplugged & storytelling
Student participation	Passive	Active	Students engaged in activities
Learning media	Limited	Developed	Use of Scratch and storytelling
Integration of local culture	Minimal	Integrated	Use of Bakisah Banjar

As shown in Table 6, there was a clear improvement in both teacher performance and student engagement during the mentoring phase. Teachers demonstrated increased confidence in applying coding instruction, while students showed higher levels of participation and creativity in learning activities. These findings indicate that the program had a positive impact not only on teacher competency but also on the overall quality of classroom learning.

The reflective process aligns with the concept of teacher professional development through experiential learning and reflective practice ([Huffman & Soller, 2020](#)). Continuous mentoring and feedback enabled teachers to refine their instructional strategies and adapt them to classroom conditions. Therefore, sustained support is essential to maximize the long-term impact of training-based community service programs.

Program Sustainability and Digital Teacher Community

As part of the sustainability strategy, the program successfully established the Ikatan Guru Kelas–Universitas PGRI Kalimantan Digital Teacher Community. This community serves as a collaborative platform for continuous professional development, enabling teachers to share best practices, exchange experiences, and address challenges collectively. The presence of this community also strengthens peer support among teachers in implementing coding instruction in their respective schools. To further describe the roles and contributions of this community in supporting program sustainability, its key functions are presented in Table 7.

Table 7 Roles of the digital teacher community in supporting program sustainability

Function	Description	Impact
Knowledge Sharing	Teachers exchange teaching strategies and experiences	Improves teaching quality
Collaborative Problem Solving	Discussing challenges in coding instruction	Provides practical solutions
Continuous Training	Ongoing learning activities and workshops	Enhances teacher competency
Cultural Integration	Sharing local culture-based teaching materials	Strengthens contextual learning
Peer Support	Mutual assistance among teachers	Builds professional confidence

As shown in Table 7, the digital teacher community plays a strategic role in sustaining the program's outcomes. It not only facilitates knowledge exchange but also supports continuous improvement in teaching practices. This collaborative environment strengthens teachers' capacity to implement coding instruction effectively and consistently.

The establishment of this community reflects the principles of Asset-Based Community Development (ABCD), which emphasize leveraging local assets to create sustainable change ([Kamariah & Jaidie, 2025](#)). By utilizing existing teacher networks and local cultural resources, the program fosters a sense of ownership and collective responsibility among participants. Through this approach, the program ensures long-term impact beyond the initial intervention and supports the ongoing development of culture-based coding education.

Overall, the findings indicate that the program successfully achieved its main targets, namely improving teachers' conceptual understanding and practical coding skills. The combination of Unplugged Coding, storytelling, and Scratch created a comprehensive learning model that is accessible, engaging, and culturally relevant. This integrated approach demonstrates the effectiveness of combining technology with local wisdom in enhancing the quality of teaching and learning.

The empirical data from pre-test and post-test assessments confirm that the intervention had a significant impact on teacher competency. In addition, qualitative findings from observations and reflections indicate increased student engagement and more meaningful learning experiences. These results suggest that the program not only improved technical skills but also enriched pedagogical practices in classroom settings.

However, several challenges were identified during the program's implementation, particularly related to limited technological infrastructure, including insufficient device availability and unstable internet access in some schools. In addition, variations in students' cultural backgrounds and differences in teachers' initial competencies also influenced the effectiveness of program implementation. These constraints highlight the need for adaptive strategies and contextual adjustments to ensure more inclusive and effective learning.

Therefore, several recommendations can be made to improve the program. First, it is necessary to strengthen institutional support, particularly in providing adequate technological infrastructure and learning facilities. Second, future programs should incorporate differentiated training strategies to accommodate varying teacher competencies and diverse student backgrounds. Third, the development of flexible and scalable learning modules is recommended to enable wider implementation across different school contexts. The following documentation of the implementation of community service activities is shown in Figure 1.



Figure 1 Implementation of community service activities

CONCLUSION

The Community Service Program of Universitas PGRI Kalimantan has successfully enhanced the competency of elementary school teachers in Banjar Regency in teaching coding based on local culture. Through Unplugged Coding, Bakisah Banjar Storytelling, and Scratch, coding education has been taught in a way that is not only fun but also deeply rooted in the local culture, making it more accessible and meaningful for students.

The program also succeeded in forming a digital teacher community that can support the ongoing development of coding education in the region. However, challenges such as limited access to technology remain obstacles that need to be addressed through further training and improved school infrastructure.

We recommend further support from the local government, educational institutions, and community networks to ensure the continuation and expansion of this program. Additionally, we suggest integrating culture-based coding into the national curriculum to ensure coding education is accessible and meaningful to students across Indonesia.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest.

AUTHOR CONTRIBUTIONS STATEMENT

Conceptualization: MS, KK; methodology: HH; formal analysis: MS; writing preparing KK.

AI DISCLOSURE STATEMENT

The author used ChatGPT (OpenAI) during the preparation of this work solely for language checking, grammar correction, and improving the clarity of the writing. After using the tool, the author thoroughly reviewed and edited the content as needed and takes full responsibility for the publication's content. The authors declare that AI was not used to generate research ideas, analyze data, create results, or draw conclusions.

ACKNOWLEDGMENTS

This community service project was funded in 2025 by the Ministry of Higher Education, Science, and Technology (Kemendiktisaintek), particularly through the Directorate General of Research and Development under the *Pemberdayaan Kemitraan Masyarakat* program. The financial support provided through this scheme enabled the implementation of the training and mentoring activities. It also supported the dissemination and documentation of the program outcomes.

REFERENCES

- Barrett, S., & Kafai, Y. B. (2010). Computational thinking and unplugged activities: A new pathway to engage kids in programming. *Journal of Educational Computing Research*, 42(3), 245-265.
- Brennan, K., & Resnick, M. (2012). New frameworks for studying and assessing the development of computational thinking. *Proceedings of the 2012 Annual Meeting of the American Educational Research Association*, 1-25.
- Caeli, E. N., & Yadav, A. (2020). Unplugged approaches to computational thinking: A historical perspective. *TechTrends*, 64(1), 29-36.
- Chen, X., Zou, D., Xie, H., & Wang, F. L. (2023). Metaverse in education: Contributors, cooperations, and research themes. *IEEE Transactions on Learning Technologies*, 16(6), 1111-1129.
- Gurney, L., & Aslan, M. (2021). Storytelling for computational thinking: An approach to enhancing coding literacy. *Educational Media International*, 58(2), 180-195.
- Huffman, D., & Soller, J. (2020). Microteaching as reflective practice in teacher education: Using simulation for teaching coding and robotics. *Journal of Educational Technology*, 25(1), 53-68.
- Kamariah, K., Harpriyanti, H., Saufi, M., & Arifin, J. (2025). Pelatihan literasi kritis berbasis deep learning bagi guru mgmp bahasa indonesia di kabupaten barito kuala. *Batuah: Jurnal Pengabdian Masyarakat*, 4(1), 27-35.
- Kamariah, K., Harpriyanti, H., Saufi, M., (2025). Workshop optimalisasi literasi calistung untuk pendidik anak usia dini di gugus paud iii kecamatan kertak hanyar. *Jurnal Pengabdian*, 4(1), 51-60.
- Kamariah, K., Harpriyanti, H., & Saufi, M. (2025). Improving early childhood literacy skills through storytelling and picture books based on local wisdom for early childhood educators. *Bubungan Tinggi: Jurnal Pengabdian Masyarakat*, 7(2), 348-358.
- Kamariah, K., & Jaidie, A. (2025). Setara dalam akses, setara dalam kesempatan: peran pendidikan kesetaraan di era digital. *Lentera: Jurnal Ilmiah Kependidikan*, 19(2).
- Kamariah, & M. Saufi. (2025). Integrasi coding dan robotik berbasis bakisah bahasa banjar untuk penguatan literasi dan numerasi siswa sd. *Senastik: Seminar Nasional Sain dan Teknologi. Universitas PGRI Kalimantan*.
- Kordaki, M., & Kafakas, P. (2017). Digital storytelling as an effective framework for the development of computational thinking skills. *EDULEARN17 Proceedings*, 13(1), 1-12.

- Lye, S. Y., & Koh, J. H. L. (2014). Review on teaching and learning of computational thinking through programming: What is next for K-12? *Computers in Human Behavior*, 41, 51–61.
- Papadakis, S., Kalogiannakis, M., & Zaranis, N. (2016). Improving mathematics teaching in kindergarten with Scratch-based learning activities. *Early Childhood Education Journal*, 44(5), 1–10.
- Resnick, M., Maloney, J., Monroy-Hernández, A., Rusk, N., Eastmond, E., Brennan, K., & Kafai, Y. (2009). Scratch: Programming for all. *Communications of the ACM*, 52(11), 60–67.
- Resnick, M., & Rosenbaum, E. (2022). Scratch: A learning environment for students and teachers. *ACM Transactions on Computing Education (TOCE)*, 9(4), 415-427.
- Wing, J. M. (2006). Computational thinking. *Communications of the ACM*, 49(3), 33-35.

AUTHOR PROFILES



M. Saufi, S.Pd., M.Pd.
muhammadsaufi@upk.ac.id
Universitas PGRI Kalimantan
Expertise: Mathematics Education, Elementary Mathematics Learning, and Education Technology
Sinta ID: 5997970
<https://scholar.google.com/citations?user=nQmDhM4AAAAJ&hl=id>



Dr. Kamariah, S.Pd., M.Pd., C.Ed.
kamariah@upk.ac.id
Universitas PGRI Kalimantan,
Expertise: Indonesian Language and Literature Education and Analysis of Early Childhood Development
Sinta ID: 5997478
Scopus ID: 58396708900
Orcid ID: 0000-000-6393-8977
<https://scholar.google.com/citations?hl=en&user=NDw7NNQAAAAJ>



Dr. Haswinda Harpriyanti, M.Pd.
haswindaharpriyanti@upk.ac.id
Universitas PGRI Kalimantan
Expertise: Language and Literature Education
Sinta ID: 5998236
Scopus ID: 57968369200
Orcid ID: 0000-0002-0145-1765
<https://scholar.google.com/citations?hl=en&user=jjnj7jIAAAAAJ>