Transformasi: Jurnal Pengabdian Masyarakat, 21 (2), 2025: 349-362
p-ISSN 1858-3571 | e-ISSN 2580-9628

STRENGTHENING COMMUNITY OF PRACTITIONERS THROUGH THE BINTANG INNOVATION PROGRAM: LITERACY AND NUMERACY TUTORING BASED ON CULTURALLY RESPONSIVE DIGITAL LITERACY MEDIA AND PLATFORMS

Atika Susanti[1]*, Nurul Renaningtias[1], Ike Kurniawati[1]
[1]Universitas Bengkulu, Bengkulu, Indonesia
*atikasusanti@unib.ac.id

Abstrak: Penguatan literasi dan numerasi di sekolah dasar membutuhkan pendekatan pembelajaran yang kontekstual dan responsif terhadap budaya lokal, mengingat banyak guru masih menghadapi tantangan dalam mengintegrasikan teknologi digital secara efektif. Kegiatan pengabdian kepada masyarakat melalui pelatihan dan pendampingan komunitas praktisi dalam Program Inovasi BINTANG (Bimbingan Belajar Literasi dan Numerasi) bertujuan meningkatkan kompetensi guru dalam memanfaatkan media dan *platform* digital berbasis budaya lokal. Metode yang digunakan adalah pendampingan intensif melalui pendekatan observasional dan *modeling*, dikembangkan dalam empat fase utama: fase perhatian (*attentional phase*), fase retensi (*retention phase*), fase reproduksi (*reproduction phase*), dan fase motivasi (*motivation phase*). Hasil evaluasi menunjukkan peningkatan pemahaman peserta pada seluruh indikator materi pelatihan, terutama pada aspek keterlibatan fitur digital dan integrasi budaya lokal dalam pembelajaran, serta antusiasme tinggi selama diskusi dan praktik penggunaan *platform*. Kegiatan ini juga membentuk komunitas praktisi yang aktif dan kolaboratif sebagai wadah berkelanjutan untuk berbagi praktik baik. Model pendampingan ini dapat direplikasi di sekolah lain, dengan rekomendasi agar media dan *platform* digital yang telah dipelajari diterapkan secara berkelanjutan dalam proses pembelajaran literasi dan numerasi berbasis budaya.

Kata Kunci: literasi, numerasi, *platform* digital, budaya lokal, komunitas praktisi

Abstract: Strengthening literacy and numeracy in primary schools requires a contextual and culturally responsive learning approach, as many teachers still face challenges in effectively integrating digital technology. This community service activity, conducted through training and mentoring of a practitioner community in the BINTANG Innovation Program (Guidance for Literacy and Numeracy Learning), aims to enhance teachers' competencies in utilizing media and digital platforms grounded in local culture. The method applied is intensive mentoring using observational and modeling approaches, developed in four main phases: attentional phase, retention phase, reproduction phase, and motivation phase. Evaluation results show an improvement in participants' understanding across all training material indicators, particularly regarding digital feature engagement and integration of local culture into learning, accompanied by high enthusiasm during discussions and practical platform use. This activity also established an active and collaborative practitioner community as a sustainable forum for sharing best practices. The mentoring model can be replicated in other schools, with the recommendation that the learned media and digital platforms be applied continuously in literacy and numeracy learning grounded in local culture.

Keywords: literacy, numeracy, digital platform, local culture, community of practitioners

Introduction

Enhancing literacy and numeracy skills among elementary school students is a national priority aimed at developing a generation that is competent, critical, and adaptive to the rapid changes of the modern era. Literacy and numeracy are not merely academic achievements; they are foundational competencies that significantly determine students' success in everyday

life (Deda et al., 2023; Getenet, 2024). However, the results of PISA 2022 indicate that Indonesian students' performance remains far below the international average. Indonesia's scores in reading literacy, mathematics, and science were 359, 366, and 383 respectively, compared to the OECD averages of 476, 472, and 485 (PISA, 2023a; PISA, 2023b; OECD, 2023). This gap reflects students' limited ability to comprehend complex texts, think critically, and apply knowledge in real-world contexts. Several factors contribute to these low scores, including the impact of the COVID-19 pandemic, disparities in educational access, and suboptimal teaching quality (PISA, 2023b; OECD, 2023).

These findings are further supported by a World Bank report (2022), which revealed that only 40% of teachers in Indonesia are able to explain academic concepts using systematic and evidence-based approaches (World Bank, 2022; Alfaruqi & Nurwahidah, 2025). In the Indonesian context, the importance of literacy and numeracy is explicitly emphasized in Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 23 of 2015 on Character Education (Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi, 2021)., and further reinforced by Regulation of the Minister of Education, Culture, Research, and Technology Number 17 of 2021 concerning the National Assessment, which positions literacy and numeracy as key indicators of educational quality. Moreover, Law Number 20 of 2003 on the National Education System stipulates that education aims to develop students' potential so that they become individuals who are faithful, pious, competent, creative, independent, and responsible democratic citizens. Therefore, strengthening literacy and numeracy is not only an academic necessity but also a constitutional mandate that must be realized systematically through adaptive and contextual educational policies, programs, and innovations.

In line with these efforts, SD Negeri 44 Kota Bengkulu holds a strategic role as a potential pioneer in strengthening literacy and numeracy through culturally responsive digital-based learning approaches. Located in an urban area, the school serves 272 students and has various resources that could be optimized, including Chromebook devices, library facilities, and adequate internet access. In addition, the school principal and teachers demonstrate a strong commitment to improving educational quality, supported by parents' awareness of the importance of education, although disparities in access to digital devices at home remain a challenge.

Despite these strengths, the results of the Minimum Competency Assessment (AKM) indicate a decline in students' literacy and numeracy achievements, signaling the need for strategic intervention. In 2023, 85% of students achieved minimum competency in literacy, which declined to 83.33% in 2024. Similarly, numeracy achievement decreased from 55% to 53.33% during the same period. This decline suggests that the use of relevant and innovative learning media still needs improvement (Kellner & Share, 2019). This condition is reinforced by Susanti et al. (2022), who reported that the implementation of the School Literacy Movement (Gerakan Literasi Sekolah) in elementary schools remains suboptimal, resulting in low effectiveness of technology-based learning. One solution considered effective is the utilization of digital media integrated with local cultural values, as this approach can make

learning more engaging, contextual, and easier for students to understand (Bulger & Davison, 2018). Therefore, the systematic integration of culturally based digital media needs to be promoted as a learning strategy that is not only relevant but also capable of addressing the declining literacy and numeracy outcomes.

Numerous studies have demonstrated that the use of digital platforms in learning can significantly improve students' literacy and numeracy skills (Dorris et al., 2024; Firdaus & Sape, 2024). Nevertheless, the integration of technology in education extends beyond mere device usage; it requires fundamental changes in teaching methods, teacher–student interactions, and the overall learning experience (Nasir, 2025). n this regard, technology plays a crucial role in expanding students' access to diverse literacy and numeracy resources, thereby enhancing learning quality (Renaningtias et al., 2024). Technology enables the provision of broader, more interactive, and engaging learning materials, which in turn can increase students' motivation and interest in learning (Lin et al., 2017; Papadakis et al., 2018). However, the implementation of technology-based learning continues to face various challenges, ranging from infrastructure limitations to teachers' digital competencies (Chew et al., 2018; Nkengbeza et al., 2022). One of the key factors for successful digital learning implementation is teachers' readiness to adopt and manage technology effectively (Phan & Dang, 2017; Wahyudi & Jatun, 2024). Therefore, enhancing teachers' digital competencies is an essential prerequisite for realizing effective, inclusive, and sustainable digital learning.

Based on observations and interviews, teachers at SD Negeri 44 demonstrate high motivation to learn and utilize technology, yet they have not received sufficient training. Teacher readiness encompasses access to technology, skills in using digital devices, and the ability to adapt to new learning models. Furthermore, learning materials are still dominated by standard textbooks that lack relevance to local culture, making them less engaging for students. In fact, Bengkulu Province possesses a rich cultural heritage and local traditions with great potential for integration into learning as a contextual approach.

The main challenges in implementing the BINTANG Innovation Program (Literacy and Numeracy Tutoring) at SD Negeri 44 include teachers' limited skills in teaching with digital media and insufficient capacity to manage technology-based learning. Many teachers are not yet familiar with culturally responsive digital platforms and have not been able to effectively manage student engagement or conduct digital assessments. In addition, parental involvement in supporting literacy and numeracy learning at home remains limited. Nevertheless, supported by the school's available resources and the collaborative spirit of its teachers, SD Negeri 44 has significant potential to become a model school for the development of culturally relevant digital-based learning models.

The selection of Bengkulu local culture is based on the fact that existing digital learning platforms are generally generic and focus primarily on technical aspects of digital literacy without integrating local socio-cultural contexts, rendering them less relevant to students' lived experiences and values. Previous studies have also tended to emphasize improving teachers' digital literacy without positioning local culture as a learning resource or for identity reinforcement. Meanwhile, studies on community-of-practitioners-based mentoring models

that integrate Bengkulu local culture into digital platforms remain very limited. Therefore, the BINTANG Innovation Program offers teacher mentoring based on communities of practitioners, integrating local culture into the development of digital learning content and platforms to ensure learning is more contextual and sustainable. This approach also involves students in content development to ensure that the materials produced are engaging and aligned with local contexts. To support program sustainability, discussion forums and teacher communities of practitioners will be established as platforms for sharing experiences and solutions. Thus, mentoring communities of practitioners represents a strategic step toward enhancing teachers' capacity to implement contextual digital learning while simultaneously building an inclusive, creative, and sustainable educational ecosystem.

The primary objective of this community service program is to improve the quality of literacy and numeracy learning at SD Negeri 44 Kota Bengkulu through training in the use of culturally responsive digital media and platforms. This program supports Sustainable Development Goal 4 (quality education), strengthens the Key Performance Indicators (IKU) of higher education institutions, and aligns with the Asta Cita agenda to develop high-quality human resources and promote the use of technology in education. Within the framework of the National Research Master Plan (RIRN), the program also contributes to advancing educational technology and the digital transformation of learning.

Method

The mentoring activities conducted by the community service team provided teachers with opportunities to gain a comprehensive understanding of the implementation of the BINTANG Innovation Program (Literacy and Numeracy Tutoring), based on Culturally Responsive Digital Literacy Media and Platforms. The program was implemented at SD Negeri 44 Kota Bengkulu, located at Jl. Kalimas 1, Jalan Gedang, Gading Cempaka, Padang Harapan, Gading Cempaka District, Bengkulu City. The participants in this program were 20 teachers from the community of practitioners at SD Negeri 44 Kota Bengkulu. This study emphasizes the empowerment of teachers and students to enhance digital literacy and numeracy skills. The activities carried out by the community service team at SD Negeri 44 Kota Bengkulu are summarized in Table 1.

Table 1. Implementation Activities of the Community Service Team

No.	Description of Community Service Activities
1	• Activities included delivering materials on basic literacy concepts in elementary schools, covering the general understanding of literacy and its relevance within the curriculum. • Participants were provided with practical strategies to enhance students' literacy skills through creative and applicable approaches. • Explanation of the principles of cultural responsiveness, focusing on integrating local cultural values into literacy learning to make it more contextual and meaningful for students.
2	• Explanation of the concepts of digital literacy and numeracy media and platforms as part of the technology-based learning approach used in the BINTANG Innovation Program.

No.	Description of Community Service Activities
	• The instructor presented key features and usage procedures of the digital media and platform applications. • Practical implementation steps were provided to enable teachers to easily and effectively integrate the technology into classroom learning.
3	• Focus on presenting the concept of numeracy in elementary schools and various efforts to improve students' numeracy skills through digital media and platforms using contextual, creative, and curriculum-integrated approaches. • The material supported the strengthening of numeracy learning grounded in local cultural values.
4	• • The instructor team collaboratively conducted mentoring activities for the teachers' community of practitioners at SD Negeri 44 Kota Bengkulu in implementing the BINTANG Innovation Program. • Activities included training and mentoring on the use of digital platforms, as well as classroom-based practice (simulation and classroom implementation). • Final evaluation and reflection were conducted as a basis for strengthening sustainable learning communities.

In its implementation, the mentoring method employed intensive assistance through an observational and modeling approach, developed across four main phases: (1) attentional phase, (2) retention phase, (3) reproduction phase, and (4) motivation phase (Winarni, 2018). The flow of the mentoring implementation method is visually illustrated in Figure 1.

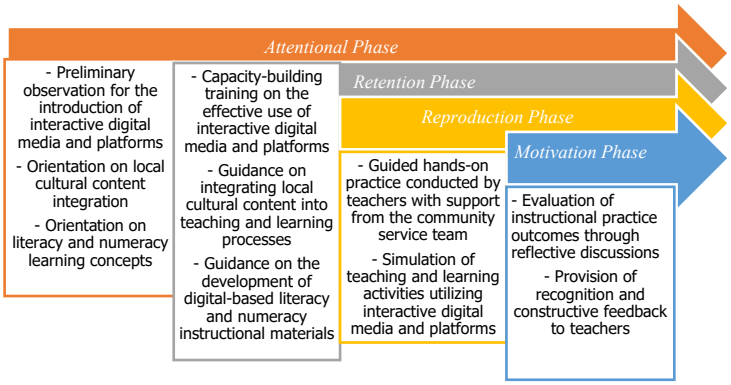

Figure 1. Flowchart of Community Service Activities

The methodological approach and technology implementation in this program applied observational and modeling strategies systematically across four main phases. The first phase, the Attentional Phase, focused on directing partners' attention, particularly teachers', to the importance of digital-based literacy and numeracy in learning. Activities at this stage included socialization sessions, interactive discussions, and the presentation of concrete examples of relevant technological features to support the learning process.

The second phase, the Retention Phase, emphasized deepening partners' understanding through practical training accompanied by intensive mentoring. The objective of this phase was to enable teachers to internalize information and concepts related to the effective use of digital literacy platforms. The subsequent phase, the Reproduction Phase, involved direct mentoring of teachers and students in applying the acquired skills within authentic learning environments. Simulations of digital media use in literacy and numeracy activities were a key component of this phase to ensure participants' readiness and independence.

The final phase, the Motivation Phase, aimed to foster and sustain teachers' and students' motivation to use digital technology in learning consistently. Reflection activities, reinforcement of the community service materials, and follow-up actions through sustainable learning community activities served as the primary strategies in this phase. The successful implementation of these four phases was further strengthened by several supporting strategies. First, the proposed solutions were aligned with the partners' priority needs to ensure that the technology applied was appropriate and relevant. Second, partners were actively involved in all stages of the program to enhance ownership, effectiveness, and sustainability. Third, a website-based digital media and platform was provided as a space for the community of practitioners to share experiences and innovations in digital learning, particularly within the context of SD Negeri 44 Kota Bengkulu.

Results and Discussion

This community service activity constitutes part of the implementation of the BINTANG Innovation Program (Literacy and Numeracy Tutoring), which was designed based on culturally responsive digital literacy media and platforms. The program aims to enhance teachers' capacity to develop literacy and numeracy learning that is contextual, technologically adaptive, and rooted in local wisdom. The activities were carried out through training and mentoring for a community of practitioners comprising 20 teachers at SD Negeri 44 Kota Bengkulu. Through a collaborative, participatory approach, participants engaged in learning sessions, hands-on practice, and instructional simulations that integrated local cultural elements through educational digital media and platforms.

Attentional Phase

The implementation of the activities was facilitated by a team of lecturers supported by two student assistants. In the initial stage, the lecturer team played a crucial role in providing a conceptual foundation for literacy in elementary education. The materials presented were not limited to definitions and the general scope of literacy, but also emphasized the urgency of strengthening literacy within the national curriculum and in response to the contextual needs of students in regional settings. Documentation of the literacy and culturally responsive material presentation is shown in Figure 2.

Figure 2. Presentation of Literacy and Culturally Responsive Learning Materials

Through a communicative and field-experience-based approach, the lecturer team guided participants to understand that literacy extends beyond basic reading and writing skills to include critical thinking, meaning-making, and effective communication. Concrete and applicable strategies were introduced to help teachers enhance students' literacy skills, such as the use of illustrated texts, interactive dialogue, and probing questioning techniques that stimulate reasoning. A key focus of this session was introducing the principle of cultural responsiveness, which refers to teachers' ability to incorporate local values, symbols, and events into learning materials so that instruction becomes more vivid, contextual, and capable of shaping students' cultural identity from an early age. This approach is believed to increase student engagement while strengthening the relevance of education to the socio-cultural environment in which students grow. Discussions and real-life examples during this session broadened participants' perspectives on the importance of embedding literacy rooted in local culture as a means of honoring identity and deepening comprehension of learning.

The lecturer team also presented materials focusing on the utilization of digital media and platforms as primary supporting instruments in literacy and numeracy learning. They explained a new technology-based learning paradigm that requires teachers not only to understand digital tools but also to use them strategically across diverse classroom contexts. Participants were introduced to various educational applications, such as the Budi Website by the Ministry of Education, Let's Read, and Literacy Cloud, which provide interactive learning resources while promoting inclusivity, cultural diversity, and accessibility. In addition, participants were guided in developing a simple website using Google Sites to support literacy and numeracy instruction. Through demonstrative and participatory approaches, the facilitators guided teachers in understanding technical features and practical steps for integrating these platforms into instructional materials and daily classroom activities. This session broadened participants' awareness that digital transformation in education is not merely about using technology, but rather about designing engaging, adaptive, and relevant learning experiences aligned with 21st-century demands.

Furthermore, the lecturer team emphasized the importance of numeracy as an essential foundational skill in elementary education. Numeracy was presented not merely as arithmetic ability, but as the capacity for logical reasoning, understanding numerical meaning in real-life contexts, and solving problems analytically. Various numeracy enhancement strategies were introduced, including digital number games, simple data visualization, and exploration of mathematical patterns derived from local culture, such as traditional numbering systems. The approach adopted was contextual and integrative, combining digital media with local wisdom to make numeracy learning more accessible, enjoyable, and meaningful. Together with the teachers' community of practitioners at SD Negeri 44 Kota Bengkulu, the instructor team implemented a participatory and transformative mentoring approach encompassing lesson planning, media design, and instructional implementation. This process functioned not only as one-way training, but also as a space for dialogue and collective reflection to strengthen teachers' competencies in designing adaptive and sustainable numeracy instruction.

Retention Phase

The retention phase emphasized the storage and consolidation of acquired knowledge, enabling its application in future practice through various reinforcement strategies. Training materials were systematically organized and complemented with implementation strategies, including concrete examples such as illustrated texts, interactive dialogues, and questioning techniques. Participants received learning modules and educational posters on literacy and numeracy based on Bengkulu's local culture, which served as visual retention tools and practical references for revisiting the materials. To support continuous learning, a Google Sites-based digital platform was developed containing contextual learning content, digital worksheets, and links to literacy platforms such as Let's Read and Literacy Cloud, enabling participants to engage in independent learning according to their needs. The retention process was further strengthened through reflection sessions, discussions, and question-and-answer activities that allowed participants to review and deepen their understanding.

Question-and-answer sessions constituted an essential component of each training sequence within the BINTANG Innovation Program. During these sessions, participants were encouraged to raise questions, share challenges, and provide feedback related to the materials delivered by the instructor team. In an open and communicative discussion atmosphere, teachers from SD Negeri 44 Kota Bengkulu demonstrated strong enthusiasm for exploring strategies for culturally responsive literacy and numeracy instruction and for using digital media. The instructor team responded with practical, relevant solutions that could be directly applied in school contexts.

Partner participation in the BINTANG Innovation Program demonstrated a high level of engagement, particularly among the teacher community at SD Negeri 44 Kota Bengkulu. Teachers were actively involved in all stages of the program, from planning and implementation to evaluation. During the planning stage, they contributed by identifying real challenges encountered in the field and providing input on the most relevant and applicable approaches. During implementation, participants actively engaged in training activities and directly applied learning outcomes within their respective school environments. At the evaluation stage, they provided constructive feedback that proved valuable for assessing program effectiveness and formulating future development strategies. This comprehensive involvement not only strengthened participants' sense of ownership but also laid a strong foundation for the sustainability of innovation. It is expected that the positive impact of this program will improve learning quality while strengthening teacher networks to advance inclusive, culturally grounded, and adaptive education.

Reproduction Phase

One of the strengths of this mentoring program was the inclusion of teaching simulation sessions that enabled participants to directly test the media and strategies they had designed, while receiving immediate feedback from instructors and peers. These sessions provided a safe space for experimentation and helped build teachers' confidence in adopting new approaches. Real classroom implementation was carried out by adjusting to students'

characteristics, local cultural contexts, and available school infrastructure, ensuring that the introduced innovations were grounded and applicable.

At the conclusion of the program, joint evaluation and reflection sessions were conducted to review program effectiveness and reinforce commitment to sustaining the learning community. Teachers were encouraged to establish peer-learning networks within the community of practitioners and to formulate follow-up action plans independently. This approach focused not only on enhancing teachers' technical competencies but also on fostering an inclusive learning ecosystem that is culturally responsive and adaptable to the demands of digital transformation. Evaluation was conducted after the completion of all training and mentoring activities through assessments of teaching skills and performance in managing digital-based literacy and numeracy learning. To complement this assessment, participant satisfaction questionnaires were distributed to obtain a comprehensive overview of program effectiveness and its impact on teachers' instructional practices. Figure 3 presents a summary of pretest and posttest results measuring participants' understanding across ten training indicators.

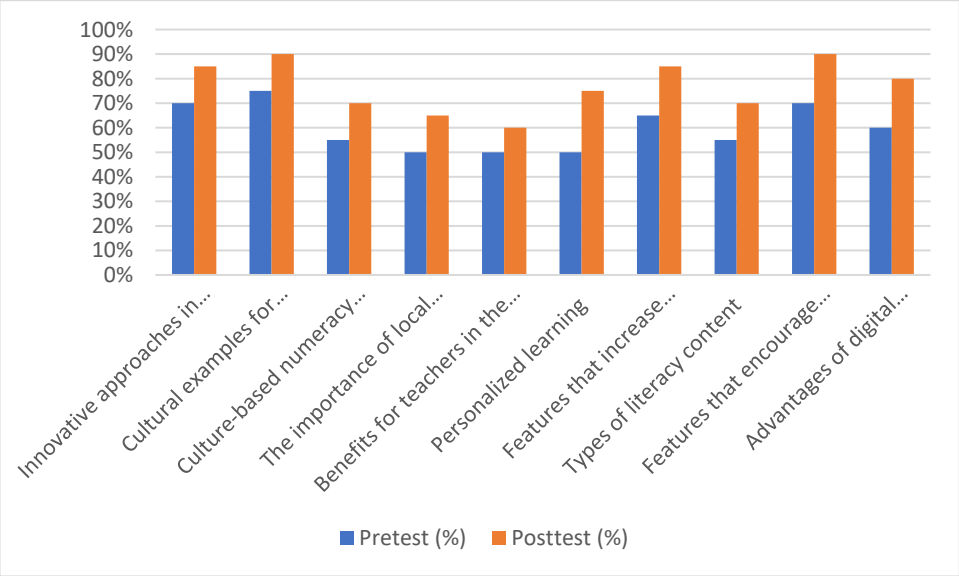

Figure 3. Summary of Pretest and Posttest Results

The results indicate improvement across all indicators following the training. Notable increases were observed in the indicators "Features that encourage engagement" and "Examples of cultural contexts for teaching mathematics," which rose from 70% to 95% and from 75% to 95%, respectively. These findings demonstrate that the training materials effectively strengthened participants' understanding of integrating local culture into literacy and numeracy learning through digital platforms. The diagram also serves as evidence of the training program's effectiveness in enhancing the professional literacy of community-of-practitioners members.

The use of a culturally based Google Sites platform proved highly effective in significantly improving teachers' understanding, as it offered contextual, accessible, and

experience-relevant digital learning. Integrating Bengkulu local culture into literacy and numeracy content transformed abstract concepts into more concrete, comprehensible learning experiences. Consequently, teachers not only learned to use the technical platform but also gained insight into how local culture can serve as a meaningful learning resource. Moreover, Google Sites' flexibility in integrating various learning media and its ease of independent development encouraged active teacher engagement throughout the training, resulting in substantially greater understanding than with generic, non-contextual digital platforms.

The outcomes of the monitoring and evaluation process serve as an important foundation for designing subsequent program development that better aligns with partners' needs and contextual challenges. Through this comprehensive evaluative approach, the BINTANG Innovation Program is expected to significantly improve students' literacy and numeracy skills by utilizing culturally sensitive digital technologies. As an innovation, the digital platform used in this program was developed as a website that explicitly showcases Bengkulu Province's cultural potential as a stimulus for contextual and meaningful literacy and numeracy learning. One of the main program outputs was the development of a Google Sites-based digital platform, accessible via the following link: (https://sites.google.com/d/1vSuEeSVZOrSk3bdkokRvkqxCRPCHj0Iv/p/1TrFjuCr4DZ8FTr-kFWrKs5ietXYAFk6l/edit). Figure 4 presents the developed digital media and platform.

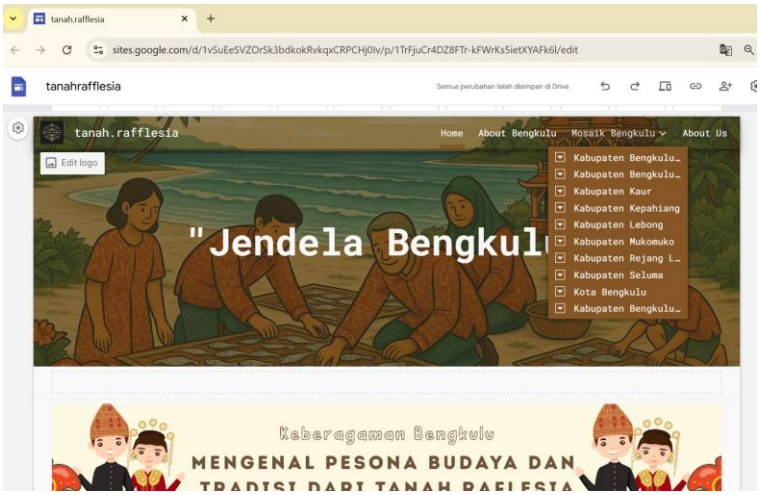

Figure 4. Display of the Digital Media and Platform

The website was designed as an interactive learning medium featuring literacy and numeracy content grounded in Bengkulu local culture. It includes contextual reading resources, digital worksheets, and integrated links to literacy platforms such as Budi Kemendikbud, Let's Read, and Literacy Cloud, thereby expanding access to adaptive and relevant teaching materials. Beyond classroom support, the platform also serves as a collaborative space for the community of practitioners to share best practices and instructional resources continuously. By integrating local culture and digital technology, the website is expected to serve as a foundation for establishing an inclusive, contextually grounded literacy and numeracy learning ecosystem.

Motivation Phase

The motivation phase aimed to foster sustained motivation so that participants would continue to apply and develop the knowledge they had acquired. Teachers were encouraged to build peer-learning networks and independently formulate follow-up action plans to strengthen the sustainability of the community of community of practitioners. Throughout the program, participants demonstrated high levels of participation and engagement, reinforcing their sense of ownership over the instructional innovations implemented. The provision of printed and digital modules, along with website-based platform support, served as additional motivational factors, enabling teachers to continuously innovate and adapt to the demands of digital transformation in education. Final reflection sessions played a crucial role in strengthening intrinsic motivation by reviewing learning achievements and potential positive impacts of the implemented practices.

As part of reinforcing the mentoring outcomes and supporting classroom implementation of literacy and numeracy learning, the community service team provided educational posters and learning modules to the teacher community at SD Negeri 44 Kota Bengkulu. The posters were visually engaging and informative, featuring contextual literacy and numeracy content integrated with Bengkulu local cultural values. These posters can be displayed in classrooms or learning spaces as visual aids to reinforce students' understanding of literacy and numeracy concepts. In addition, teachers received literacy and numeracy learning modules developed using culturally responsive and contextual approaches. The modules include active learning strategies, student worksheets, and guidelines for using the developed website-based digital platform, and were designed to be easily adapted across grade levels and student characteristics.

The provision of these posters and modules aims to ensure program sustainability, offer tangible instructional references for classroom use, and encourage teachers to continuously innovate in creating meaningful, engaging, and relevant learning experiences. With the support of both printed and digital instructional materials, literacy and numeracy learning is expected to become more dynamic, effective, and responsive to local needs and global educational challenges. As a closing activity, a joint documentation session was conducted involving the community service team and participants from the teachers' community of practitioners at SD Negeri 44 Kota Bengkulu. This activity symbolized the collaborative spirit, shared commitment, and collective effort in advancing contextual and adaptive literacy and numeracy learning.

Overall, this mentoring program demonstrates that strengthening literacy and numeracy through a local-culture-based approach integrated with digital technology can significantly enhance teachers' pedagogical competencies. The integration of culturally grounded learning media and digital platforms not only enriches instructional strategies but also increases teachers' motivation and engagement in developing innovative learning practices (Azima et al., 2025; Sukrin & Ihlas, 2025), in line with the Ministry of Education, Culture, Research, and Technology (2021), which emphasizes that foundational literacy and numeracy should be developed contextually and in alignment with students' lived experiences. Through this

training, teachers also experienced a shift in perspective regarding literacy and digitalization, where technology is no longer viewed as a threat to local culture, but rather as a means to integrate and strengthen Bengkulu local wisdom in learning. This shift underscores the importance of collaboration within communities of practice as part of sustainable professional learning, while fostering a reflective, adaptive, and sustainable learning ecosystem.

Conclusion

The community service activity conducted through training and mentoring of the Community of Practitioners within the BINTANG Innovation Program (Literacy and Numeracy Learning Assistance), which is based on culturally responsive digital literacy media and platforms, was successfully implemented and demonstrated a positive impact on improving participants' competencies. Based on the pretest and posttest results, a significant increase in participants' understanding was observed across all training indicators, particularly in aspects related to engagement with digital features and the integration of local cultural content into learning activities. Participants showed high enthusiasm throughout the training process, especially during discussion sessions and hands-on practice with digital literacy platforms. This finding reflects the strong need and interest of teachers and prospective teachers in contextual, technology-based learning approaches. Furthermore, this activity successfully established an active and collaborative community of practitioners that serves as a sustainable forum for sharing best practices in culture-based literacy and numeracy learning. Thus, this program not only enhanced participants' individual capacities but also strengthened a more inclusive, innovative, and locally relevant educational ecosystem. The mentoring and training model applied in this activity has the potential to be replicated in other schools, particularly in regions rich in local cultural heritage, in order to expand the impact of innovations in literacy and numeracy learning. It is recommended that the use of digital media and platforms introduced in this program be implemented sustainably in classroom practices and integrated into learning processes that are relevant to literacy, numeracy, and local cultural contexts.

Acknowledgements

The authors would like to express their sincere gratitude to the Directorate General of Higher Education, Research, and Technology (Ditjen Diktiristek), through the Directorate of Research, Technology, and Community Service (DRTPM), for funding this community service activity under the Community-Based Empowerment Scheme, which enabled the successful implementation of this program. This activity was conducted under Derivative Contract Number 2905/UN30.15/PM/2025. Appreciation is also extended to the principal, teachers, and staff of SD Negeri 44 Kota Bengkulu for their support and active participation in implementing this program.

References

Alfaruqi, A. Z., & Nurwahidah, N. (2025). Reflection on Indonesia's pisa scores and the 2024 Madrasah Teacher Competency Assessment Results: Challenges in enhancing teacher competence. *Jurnal Pendidikan IPS*, *15*(1), 11–19. https://doi.org/10.37630/jpi.v15i1.2559

Azima, N. F., Syami, S. S., Algifari, A., Anjani, N., & Ibrahim, S. (2025). Development of Culturally-Based Children's Storybooks with Digital Integration. *Jurnal Ilmiah Sekolah Dasar*, *9*(1). https://doi.org/10.23887/jisd.v9i1.87765

Bulger, M., & Davison, P. (2018). The promises, challenges, and futures of media literacy. *Journal of Media Literacy Education*, *10*(1), 1–21. https://doi.org/10.23860/JMLE-2018-10-1-1

Chew, S. W., Cheng, I.-L., Kinshuk, & Chen, N.-S. (2018). Exploring challenges faced by different stakeholders while implementing educational technology in classrooms through expert interviews. *Journal of Computers in Education*, *5*(2), 175–197. https://doi.org/10.1007/s40692-018-0102-4

Deda, Y. N., Disnawati, H., & Daniel, O. (2023). How important of students' literacy and numeracy skills in facing 21st-century challenges: A systematic literature review. *Indonesian Journal of Educational Research and Review*, *6*(3), 563–572. https://doi.org/10.23887/ijerr.v6i3.62206

Dorris, C., Winter, K., O'Hare, L., & Lwoga, E. T. (2024). Mobile device use in the primary school classroom and impact on pupil literacy and numeracy attainment: A systematic review. *Campbell Systematic Reviews*, *20*(2), e1417. https://doi.org/10.1002/cl2.1417

Firdaus, A. M., & Sape, H. (2024). Pengaruh Platform Digital Terhadap Kemampuan Literasi Numerasi Siswa. *Jurnal Penalaran Dan Riset Matematika*, *3*(2), 73–80. https://doi.org/10.62388/prisma.v3i2.490

Getenet, S. (2024). The influence of students' prior numeracy achievement on later numeracy achievement as a function of gender and year levels. *Mathematics Education Research Journal*, *36*(4), 745–766. https://doi.org/10.1007/s13394-023-00469-7

Kellner, D., & Share, J. (2019). *The critical media literacy guide: Engaging media and transforming education* (Vol. 2). Brill.

Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. (2021). *Panduan Pembelajaran Literasi dan Numerasi di Sekolah Dasar.* Jakarta: Direktorat Jenderal Guru dan Tenaga Kependidikan, Kemendikbudristek.

Lin, M.-H., Chen, H.-C., & Liu, K.-S. (2017). A study of the effects of digital learning on learning motivation and learning outcome. *Eurasia Journal of Mathematics, Science and Technology Education*, *13*(7), 3553–3564. https://doi.org/10.12973/eurasia.2017.00744a

Nasir, M., & Sutiah, S. (2025). Pengintegrasian teknologi dalam pembelajaran di era digital (sebuah kajian pustaka). *Literasi: Jurnal Ilmu Pendidikan*, *16*(1), 66-77. https://doi.org/10.21927/literasi.2024.16(1).66-77

Nkengbeza, D., Mbuzi, D., & Chainda, A. M. (2022). Challenges faced by primary school English teachers in integrating media technology in the teaching and learning of English. *Creative Education*, *13*(4), 1139–1153.

OECD. (2023). PISA 2022 Results (Volume II): Learning During – and From – Disruption. OECD. https://doi.org/10.1787/a97db61c-en

Papadakis, S., Kalogiannakis, M., & Zaranis, N. (2018). The effectiveness of computer and tablet assisted intervention in early childhood students' understanding of numbers. An empirical study conducted in Greece. *Education and Information Technologies*, *23*(5), 1849–1871. https://doi.org/10.1007/s10639-018-9693-7

Phan, T. T. N., & Dang, L. T. T. (2017). Teacher readiness for online teaching: A critical review. *International Journal on Open and Distance E-Learning*, *3*(1). Retrieved from: https://ijodel.upou.edu.ph/ijodel/article/view/18

PISA, O. (2023a). Results (volume I): the state of learning and equity in education. *PISA. Paris*.

PISA, O. (2023b). *PISA 2022: Assessment and Analytical Framework. Paris: PISA*. OECD Publishing Paris.

Renaningtias, N., Susanti, A., Mirzana, B., Prasetyo, C., & Lestari, D. (2024). Optimalisasi Pembelajaran Literasi Numerasi Melalui Pelatihan Penggunaan Website Google Sites bagi Guru Komunitas Belajar. *I-Com: Indonesian Community Journal*, *4*(3), 2344–2355. https://doi.org/10.33379/icom.v4i3.5359

Sukrin, S., & Ihlas, I. (2025). Integrasi Etnopedagogi dan Artificial Intellegence: Pendekatan Inovatif dalam Pembelajaran Bahasa Indonesia Berbasis Kearifan Lokal. *Jurnal Inovasi Pendidikan Dasar Dan Menengah*, *2*(1), 1–15. https://doi.org/10.71301/jipdasmen.v2i1.76

Susanti, A., Dalifa, D., Melisa, M., & Yolanda, F. (2022). Pendampingan penerapan literasi budaya dan kewargaan berbasis GLS untuk mengembangkan civic engagement siswa di SDN 88 Kota Bengkulu. *Manhaj: Jurnal Penelitian dan Pengabdian Masyarakat*, *11*(2), 147–160.

Wahyudi, N. G., & Jatun, J. (2024). Integrasi Teknologi dalam Pendidikan: Tantangan dan Peluang Pembelajaran Digital di Sekolah Dasar. *Indonesian Research Journal on Education*, *4*(4), 444–451. https://doi.org/10.31004/irje.v4i4.1138

Winarni, E. W. (2018). *Teori dan Praktik Penelitian Kuantitatif, Kualitatif, PTK, R&D.* Jakarta: Bumi Aksara.

World Bank. (2022). Global Education Policy Dashboard: Numeracy Indicators and Progress.Washington DC: World Bank