e-ISSN: 2961-7901

JURNAL PENGABDIAN SAINS DAN HUMANIORA
Diterbitkan Oleh Fakultas Keguruan dan Ilmu Pendidikan, Universitas Timor
https://jurnal.unimor.ac.id/index.php/JPSH Vol. 5, No. 1, 2026, pp. 44-57

https://doi.org/10.32938/jpsh.v5i1.10807

Training on the Development of Flipbook-Based Digital Teaching Materials to Improve Teacher Competence

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Received: February 26, 2025|**Revised**: May 21, 2025|**Accepted**: May 25, 2025|**Published online**: May 31, 2025

Abstract

The transformation of 21st-century education requires teachers to possess adequate digital literacy competencies, particularly in developing innovative and interactive teaching materials. This Community Service Program aimed to enhance teachers' ability to develop flipbook-based digital teaching materials using Canva and Heyzine applications. The program was implemented at SMP Negeri 29 Bengkulu Tengah, involving 15 teachers from various subject areas. The implementation method consisted of three stages: socialization, training and technology implementation, and evaluation. The results indicated a significant improvement in teachers' understanding and technical skills in developing digital learning media. All participants successfully produced a flipbook aligned with their respective subjects and showed positive responses to the ease of using the applications. Overall, the program effectively strengthened teachers' digital pedagogical competencies and supported more interactive learning aligned with the Merdeka Curriculum. Therefore, similar training activities should be carried out regularly and expanded to other schools so that more teachers can develop interactive digital learning media effectively.

Keywords: Digital Teaching Materials, Flipbook, Teacher Competence, Training.

Abstrak

Transformasi pendidikan abad ke-21 menuntut guru untuk memiliki kompetensi literasi digital yang memadai, khususnya dalam pengembangan bahan ajar yang inovatif dan interaktif. Program Pengabdian kepada Masyarakat ini bertujuan untuk meningkatkan kemampuan guru dalam mengembangkan bahan ajar digital berbasis flipbook menggunakan aplikasi Canva dan Heyzine. Kegiatan dilaksanakan di SMP Negeri 29 Bengkulu Tengah dengan melibatkan 15 guru dari berbagai mata pelajaran. Metode pelaksanaan terdiri dari tiga tahap, yaitu sosialisasi, pelatihan dan implementassi teknologi, dan evaluasi. Hasil menunjukkan adanya peningkatan signifikan pada pemahaman dan keterampilan teknis guru dalam mengembangkan media pembelajaran digital. Seluruh peserta berhasil menghasilkan satu produk flipbook sesuai mata pelajaran masing-masing, serta menunjukkan respons positif terhadap kemudahan penggunaan aplikasi. Secara keseluruhan, program ini efektif dalam memperkuat kompetensi pedagogi digital guru dan mendukung pembelajaran yang lebih interaktif serta relevan dengan Kurikulum Merdeka. Oleh karena itu, kegiatan pelatihan serupa harus dilakukan secara teratur dan diperluas ke sekolah lain agar lebih banyak guru dapat mengembangkan media pembelajaran digital interaktif secara efektif.

Kata Kunci: *Bahan ajar digital, Flipbook, Kompetensi guru, Pelatihan.*

How to Cite: Syahfitri, J., et al. (2025). Training on the Development of Flipbook-Based Digital Teaching Materials to Improve Teacher Competence. *Jurnal pengabdian sains dan humaniora*, 5 (1), 44-57.

Introduction

Twenty-first century education demands a transformation in the learning process that integrates digital technology as an essential part of teaching and learning activities. Teachers are no longer solely information providers; they also serve as facilitators and creative, innovative designers of learning (Saavedra et al., 2012). In this digital era, technology-based learning has been proven to create significant opportunities for personalized learning, as well as to enhance student engagement and learning outcomes through the use of educational software, online platforms, and hybrid approaches that adapt to learners' needs (Zou et al., 2025).

Recent studies indicate that the integration of digital technology into instructional materials, particularly through multimedia-based learning design and deep digital learning models can simplify abstract concepts, strengthen conceptual understanding, and significantly enhance students' critical thinking and problem-solving skills (Arianto et al., 2026). Visual representations, interactive simulations, and the presentation of content through animations and digital platforms enable learners to construct understanding in a more concrete and meaningful way compared to conventional approaches. These impacts are reflected not only in improved learning outcomes, but also in the development of collaborative skills and higher-order thinking abilities that are integral to twenty-first century competencies. In line with this, the need for teachers' digital literacy is increasing, as the ability to design, select, and effectively utilize digital learning resources has become an inseparable part of educators' professionalism in supporting successful learning processes (Putri & Asrizal, 2023; Adriana et al., 2024). Moreover, studies indicate that skills in developing digital instructional materials not only influence student engagement, but also contribute to the development of learners' complex thinking, creativity, and problem-solving abilities when such materials are designed based on sound pedagogical principles (Harisman et al., 2025). Therefore, one of the essential skills teachers must possess is the ability to develop digital instructional materials that are engaging, interactive, and aligned with learners' characteristics. Digital learning materials designed with consideration of students' needs and preferences play a strategic role in shaping meaningful learning experiences and in enhancing twenty-first century competencies, such as critical thinking, collaboration, communication, and creativity (Pecson et al., 2024).

In the context of digital learning, which emphasizes the importance of interactive instructional design and the strengthening of teachers' digital literacy, flipbooks have emerged as an innovative medium that is relevant for addressing these needs. A flipbook is a form of digital instructional material that combines the characteristics of conventional books with interactive multimedia features, enabling the integration of text, images, animations, audio, and video within a single digital platform accessible across various devices. In digital learning contexts, flipbooks are regarded as interactive learning media that present content in an electronic book format while incorporating visual and audiovisual elements to enhance student engagement (Setyorini et al., 2024). Research on the development of digital flipbooks shows that this medium is designed to be accessible through electronic devices such as computers, tablets, and smartphones, while providing dynamic and informative learning content (Yunitasari et al., 2025). With these multimedia features, flipbooks can support a more engaging and flexible learning process compared to traditional printed media (Harefa et al., 2025).

A number of studies indicate that the use of multimedia-based flipbooks is effective in improving students' conceptual understanding and learning engagement, as they are able to present abstract material through more concrete visual and interactive representations (Rahmadani, 2024; Mahendri et al., 2023; Sari, et al., 2024). This is consistent with the Cognitive Theory of Multimedia Learning, which states that the structured integration of text and visuals can reduce cognitive load and strengthen students' knowledge construction (Mayer, 2024; Mayer, 2002). Studies on the development of flipbook-based e-modules have also reported improvements in students' learning outcomes and motivation following the use of interactive digital media compared to conventional printed instructional materials (Marpaung et al., 2024). Thus, flipbooks function not only as a medium for delivering information, but also as a means of facilitating active and meaningful learning.

The use of flipbooks is aligned with the demands of twenty-first century competencies, which emphasize the importance of digital literacy, creativity, communication, and critical thinking skills in learning (Voogt et al., 2015). However, various studies indicate that teachers' readiness to integrate digital technology remains a major challenge in the implementation of innovative learning (Ilomäki et al., 2016; Smestad et al., 2023). Many teachers still experience difficulties in designing interactive digital learning media that align with sound pedagogical principles, causing instruction to remain largely oriented toward conventional methods. This condition affects students' learning motivation due to the lack of variety and interactivity in the learning process. A similar situation has also been identified at SMPN 29 Bengkulu Tengah, where teachers continue to face challenges in integrating digital technology as a result of limited training opportunities, facilities, and technical competencies. Therefore, a Community Service Program is needed, focusing on strengthening teachers' competencies in developing flipbook-based digital instructional materials. This program is expected to enhance teachers' professional capacity while promoting more interactive, effective learning that aligns with the demands of twenty-first century competencies.

The results of initial interviews and observations conducted at SMP Negeri 29 Bengkulu Tengah indicate several key problems that hinder the optimization of digital-based learning processes. These issues were identified across several aspects, namely teacher competence, technological facilities, instructional methods, and digital literacy. From the perspective of teacher competence, it was found that most teachers have never received training related to the development of interactive digital instructional materials such as flipbooks. As a result, teachers experience difficulties in designing innovative and engaging learning media for students. In fact, interactive digital learning media play an important role in enhancing students' engagement, motivation, and active participation during the learning process, as they enable interaction, visualization, and more meaningful learning experiences (Bond et al., 2021; Schindler et al., 2017). This condition indicates a skills gap between the demands of twenty-first century learning and teachers' ability to integrate educational technology in the classroom. From the perspective of technological facilities, there are still limitations in supporting equipment such as laptops and stable internet access within the school environment. This inadequate infrastructure makes it difficult to implement digital learning optimally. Various studies show that the availability of technological facilities and infrastructure is a primary prerequisite for the success of digital transformation in education, as it determines teachers' and students' access to digital learning resources as well as the effectiveness of technology-based

learning implementation (Pettersson, 2018; Tondeur et al., 2012; Haleem et al., 2022). The lack of devices and limited internet connectivity not only hinder teachers in developing digital instructional materials but also restrict students' access to broader learning resources.

In terms of instructional methods, the learning process at SMP Negeri 29 Bengkulu Tengah is still dominated by lecture-based approaches and the use of textbooks, resulting in largely one-way classroom interactions. Such learning patterns are less effective in encouraging active student participation and do not adequately support the development of higher-order thinking skills (Bhuttah et al., 2024)**.** In addition, teachers' low digital literacy has become a major barrier to the implementation of innovative learning. Many teachers still face difficulties integrating technology into both instructional planning and classroom practice due to limited pedagogical digital competencies. Recent studies emphasize that teachers' digital competence is a key determinant of the success of technology-based learning, as it influences their ability to design interactive, collaborative, and meaningful learning activities (OECD, 2025).

These findings are consistent with reports from UNESCO, which state that the main challenge in the digital transformation of education lies in the limited pedagogical and digital capacities of teachers to use technology effectively. Various studies also show that systematic training programs on the development of digital instructional materials can enhance teachers' technological readiness, foster instructional creativity, and improve their ability to integrate technology with appropriate pedagogical strategies (Philipsen et al., 2019). Therefore, strategic interventions are needed through training and mentoring programs that focus on strengthening digital literacy and teachers' ability to develop technology-based interactive instructional materials. Such efforts are expected to enhance teachers' professionalism while promoting more participatory, adaptive learning that is relevant to the demands of twenty-first century competencies. Based on these conditions, this community service program aimed to improve teachers' digital literacy and pedagogical competencies through training on the development of flipbook-based digital teaching materials using Canva and Heyzine applications at SMP Negeri 29 Bengkulu Tengah.

Method

This community service activity was conducted in July 2025 and involved 15 teachers from SMP Negeri 29 Bengkulu Tengah. The implementation method of this Community Service program was designed based on an empowerment and technology transfer approach through a combination of training and mentoring. The activities were carried out through three main stages: 1) socialization, 2) training and technology implementation, 3) evaluation.

1. Socialization

   The initial socialization stage served as the foundation of the program, aiming to provide participants with a preliminary understanding of the concept of flipbook-based digital instructional materials, their benefits in learning, and the overall implementation flow of the Community Service Program. At this stage, teachers were introduced to the challenges of learning in the digital era and the important role of teachers as creators of innovative learning media.

   The socialization activities began with an introduction to the concept of digital flipbooks by the implementation team. Flipbooks were explained as interactive learning

media that resemble printed books but are equipped with digital features such as text, images, videos, audio, and external links that support independent learning. This medium is highly relevant for modern learning because it can enhance interactivity and encourage students' active engagement in the learning process.

Furthermore, teachers were provided with an overview of the importance of digital literacy, including how technology integration has become an essential part of learning in line with the demands of the Merdeka Curriculum. Teachers were expected to understand that twenty-first century learning requires not only mastery of subject matter but also skills in utilizing educational technology. In the subsequent session, the implementation team explained the Community Service Program flow, including the stages of activities, targeted outcomes, and the roles and responsibilities of participants throughout the program. The socialization stage concluded with an interactive discussion to identify teachers' challenges and needs in developing digital instructional materials. This discussion provided an initial picture of teachers' levels of digital literacy and their readiness to participate in the training.

2. Training and technology implementation

The training and technology implementation stage constituted the core activity of the Community Service Program. At this stage, teachers were introduced to and directly practiced the use of digital technologies for developing interactive instructional materials. The activities focused on strengthening teachers' practical skills in utilizing Canva and Heyzine applications to create flipbook-based digital teaching materials. The training was conducted using a hands-on practice approach, enabling participants to learn through direct experience and active participation.

In the first phase, participants were trained to implement Canva as a digital design tool for developing engaging instructional materials. Teachers learned how to select appropriate templates, organize page layouts systematically, and integrate supporting visual elements such as images, icons, animations, and QR codes linked to learning videos or external resources. Through this activity, teachers practiced applying digital technology to produce more interactive and visually appealing learning content.

In the second phase, participants implemented the Heyzine platform to transform their Canva designs into interactive digital flipbooks. Teachers learned how to upload their instructional materials, configure page navigation features, and embed multimedia elements such as audio, videos, hyperlinks, and interactive buttons. As part of the implementation process, each teacher independently developed a flipbook based on their own subject matter. Throughout the activities, the implementation team provided continuous mentoring and technical guidance to ensure that participants were able to effectively apply both technologies in the development of digital instructional materials.

3. Evaluation

The evaluation stage was conducted to assess the overall success of the program, including the implementation process, the quality of the products, and their impact on both teachers and students. This stage was essential to ensure that the program provided tangible benefits and could be further developed. Product evaluation was carried out by assessing the quality of the flipbooks using an evaluation rubric covering aspects of visual design, interactivity, and alignment with learning objectives. Process evaluation was conducted through questionnaires measuring participants' satisfaction, attendance rates, and levels of

teacher participation throughout the program. In addition, impact evaluation was performed using pre-tests and post-tests to measure improvements in teachers' competencies. Observations were also conducted during the learning process to identify changes in students' motivation and engagement, while qualitative data were collected through interviews with teachers and students.

The data obtained from these instruments were analyzed using both quantitative and qualitative approaches. Quantitative data from questionnaires, attendance records, product assessment rubrics, and pre-test and post-test results were analyzed descriptively using percentages and mean scores to determine the level of teacher participation, satisfaction, and competency improvement after the program implementation. Meanwhile, qualitative data obtained from observations and interviews were analyzed through data reduction, categorization, and interpretation to identify participants' responses, challenges encountered during implementation, and the perceived impact of flipbook-based learning media on classroom learning. The results of the analysis were then compiled into a final Community Service Program report, which also included recommendations for sustainability and strategies for further program development so that it could be implemented in other schools.

Results and Discussion

The implementation of this Community Service Program was carried out in stages over a period of three months, involving 15 teachers from various subject areas at SMP Negeri 29 Bengkulu Tengah. The program aimed to strengthen teachers' competencies in developing flipbook-based digital instructional materials using Canva and Heyzine applications. The outcomes of the program covered several aspects as follows.

1. Results of the Socialization Stage

The socialization stage served as the initial step in introducing the concept of digital transformation to teachers, particularly in the use of technology to support more interactive learning aligned with the demands of the Merdeka Curriculum. During this stage, teachers showed positive responses and active participation in discussions regarding the challenges and opportunities of technology integration in classroom learning. Teachers also gained a better understanding of the importance of digital literacy and their strategic role not only as facilitators, but also as designers and developers of technology-based instructional materials. In addition, the socialization activities introduced digital flipbooks as innovative and flexible learning media capable of integrating text, visuals, videos, and other multimedia elements within a single platform. Teachers demonstrated increased interest in utilizing digital learning media because flipbooks were considered more interactive and attractive compared to conventional printed materials.

These findings indicate that the socialization stage played an important role in building teachers' awareness, motivation, and readiness to adopt educational technology. Previous studies have shown that socialization activities and digital awareness programs are essential initial steps in encouraging teachers' readiness to implement technological innovation, as they contribute to the development of positive perceptions, self-confidence, and motivation in using technology for classroom learning (Falloon, 2020; Guerra-antequera et al., 2022).

Figure 1. *Socialization Activity*

4. Results of the Training and technology implementation Stage

The Training and Technology Implementation stage was conducted in two main sessions: training on the use of Canva for designing digital instructional materials and technology implementation using Heyzine to convert these designs into interactive flipbooks. The activities applied a hands-on approach, enabling teachers not only to gain conceptual understanding but also to acquire direct technical experience in developing digital learning media independently. During this stage, all participating teachers successfully produced initial drafts of instructional materials aligned with their respective subjects and implemented digital technology by transforming the materials into interactive flipbooks containing text, images, videos, and hyperlinks. The results also showed that teachers became more confident in utilizing digital technology for classroom instruction and demonstrated active participation throughout the activities.

These findings indicate that training combined with direct technology implementation can support teachers in adopting educational technology more effectively and improving their digital pedagogical competencies. The results are consistent with previous studies stating that hands-on and collaborative professional development activities are effective in enhancing teachers' technological skills because they provide authentic learning experiences oriented toward solving real classroom problems (Darling-hammond et al., 2017).

Figure 2. *Teacher Training and Mentoring in Developing Digital Instructional Materials*

From a quantitative perspective, all teachers were able to complete the stages of developing flipbook-based instructional materials during the training and technology implementation activities. Teachers successfully designed digital learning content using Canva and transformed it into interactive flipbooks through the Heyzine platform. The resulting products demonstrated that participants were able to apply various multimedia features introduced during the training, including the integration of images, videos, hyperlinks, animations, and QR codes into learning materials. These findings indicate that

the training activities effectively facilitated teachers in applying digital technology to instructional media development. Examples of the flipbook products developed by teachers during the program are presented in Figure 3.

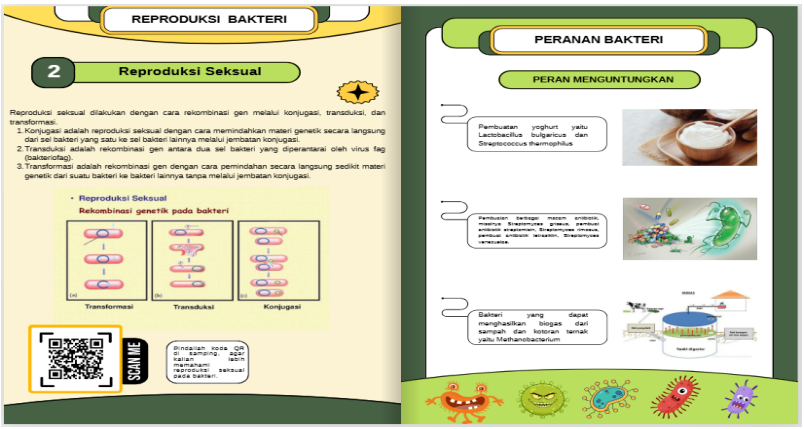

Figure 3. *Examples of the Flipbook Products Developed by Teachers*

Figure 3 shows that teachers were able to successfully develop flipbook-based digital instructional materials by applying the skills acquired during the training and technology implementation activities using Canva and Heyzine. The flipbooks were designed with attractive visual layouts and equipped with interactive multimedia features such as QR codes linked to learning videos and practice exercises. Through these features, students could independently access additional learning resources using their digital devices, making the learning process more interactive and engaging. The integration of multimedia elements into the flipbooks also reflected teachers' increasing creativity and competence in developing technology-based instructional materials aligned with the characteristics of twenty-first century learning.

The successful implementation of the activities was also supported by teachers' positive perceptions regarding the use of Canva and Heyzine as digital learning media development tools. Teachers considered both applications practical and supportive for creating more attractive and interactive instructional materials. These findings are consistent with recent studies indicating that perceived ease of use is a key factor influencing the successful adoption of educational technology by teachers (Antonietti et al., 2022). Other studies also emphasize that hands-on training can enhance teachers' digital competencies while simultaneously reducing technology anxiety among educators (König et al., 2020).

From a qualitative perspective, the training activities contributed to increased teacher confidence and creativity in utilizing digital technology for learning. The flipbooks produced reflected diverse instructional designs adapted to the characteristics of each subject area. For example, science teachers integrated experiment videos and animated illustrations, while social studies teachers incorporated interactive maps and visual learning resources to support students' understanding of abstract concepts. Teachers also demonstrated greater independence in organizing learning materials systematically and creatively through multimedia integration.

Following the training activities, teachers began implementing flipbooks in classroom instruction as alternative media to complement conventional textbooks and presentation slides. Flipbooks were integrated into lesson planning aligned with the Merdeka Curriculum

and used to support more student-centered learning activities. During classroom implementation, students appeared more enthusiastic and actively involved in learning activities using flipbook-based media. Teachers reported that students showed greater interest in accessing learning materials independently because the media could be accessed easily through smartphones and other digital devices.

Qualitatively, teachers stated that the use of flipbooks created a more interactive learning atmosphere and reduced students' boredom during lessons. Students who were previously less interested in reading printed materials became more engaged because the flipbooks presented learning content through a combination of visuals, audio, animation, and interactive features that made the material more concrete and easier to understand. Thus, the implementation of flipbooks not only strengthened teachers' digital pedagogical competencies but also contributed to improving the quality of students' learning experiences.

2. Evaluation

The evaluation stage was conducted as a follow-up phase to comprehensively assess the program's success from three main aspects: the implementation process, the quality of the products produced, and their impact on classroom teaching practices. Process evaluation focused on the execution of training and mentoring activities, including the level of teacher participation, engagement during the sessions, and the alignment of training methods with participants' needs.

From the process evaluation, the results showed that the program was implemented effectively, as reflected in the 100% attendance rate and the active participation of teachers throughout the training and mentoring activities. Questionnaire analysis indicated that 86.7% of participants considered the training highly relevant to their instructional needs, while 80% stated that the Canva and Heyzine applications were relatively easy to use after receiving direct mentoring. These findings suggest that the training activities successfully supported teachers' readiness to integrate digital technology into classroom learning.

The impact evaluation demonstrated improvements in teachers' digital competencies. Pre-test and post-test results showed a significant increase in teachers' understanding and technical skills related to the development of digital instructional materials. The average teacher competency score increased from 48.6 before the program to 76.2 after the socialization stage, followed by further improvement during the training and implementation stage with an average increase of 38 points. These results indicate that the combination of training and mentoring effectively enhanced teachers' digital literacy and technological competencies.

From the product evaluation perspective, all teachers (100%) successfully developed flipbook-based instructional materials aligned with their respective subjects. Based on the product assessment rubric, most flipbooks met the criteria for effective digital learning media in terms of visual design, interactivity, multimedia integration, and alignment with learning objectives. The flipbooks also demonstrated teachers' creativity in adapting digital content according to subject characteristics and student learning needs.

Observations conducted during classroom implementation further showed positive impacts on student learning engagement. Approximately 82% of students actively participated in classroom discussions using flipbook-based media, while 75% independently accessed learning materials through their digital devices. Qualitative findings from

interviews revealed that teachers perceived students to be more enthusiastic, motivated, and interested in learning through interactive flipbook media compared to conventional printed materials. These findings demonstrate that the program not only improved teachers' professional competencies but also contributed to creating more interactive and meaningful learning experiences for students (Unayah et al., 2024; Sari et al., 2025; Ghifari & Linggowati, 2024).

However, the evaluation also identified several challenges during program implementation. Some teachers experienced difficulties keeping up with the training pace due to limited laptop capacity, particularly slow performance when running digital design applications. In addition, several participants were not yet familiar with the features of Canva and Heyzine, which required a longer adaptation period. These constraints temporarily affected the smoothness of practical activities, especially during the design processing and conversion stages into interactive flipbooks. Nevertheless, these challenges were successfully addressed through intensive mentoring strategies implemented during the training. The service team provided individualized guidance for teachers facing difficulties while also encouraging peer learning through experience sharing among participants who had already mastered the applications. This collaborative approach proved effective in accelerating participants' adaptation processes. Furthermore, the team provided video tutorial guides that teachers could access independently after the training, enabling them to continue developing their skills sustainably.

From the product quality perspective, the evaluation showed that most flipbooks produced by teachers met the standards of effective digital learning media, as indicated by comprehensive content, attractive visual design, systematic material organization, and the integration of interactive elements such as videos, hyperlinks, and animations. This reflects an improvement in teachers' digital pedagogical competence in designing more innovative and student-centered learning materials.

Conclusion

The teacher competency strengthening program in developing flipbook-based digital teaching materials demonstrated effective results through the stages of socialization, training and technology implementation, and evaluation. The effectiveness of the program was measured through several indicators, including teachers' active participation during the activities, improvements in teachers' digital competency scores based on pre-test and post-test results, positive participant responses obtained from questionnaires, and the successful completion of flipbook-based instructional materials by all participants. Teachers not only gained an understanding of the importance of digital transformation but also acquired practical skills in designing interactive learning media. The program outcomes indicated improvements in teachers' knowledge, skills, and attitudes, as evidenced by all participants successfully producing flipbooks that were suitable for classroom use.

The implementation of flipbooks in the classroom also had a positive impact on learning, particularly in increasing students' motivation, participation, and independent learning. The program further encouraged the formation of a community of teacher flipbook creators as a platform for collaboration and the sustainability of digital learning innovation in schools.

Moving forward, the sustainability of the program needs to be supported through advanced training, adequate infrastructure provision, integration of flipbooks into instructional planning, and strengthening teacher communities through the sharing of best practices and periodic evaluation. Thus, this program contributes to the realization of more interactive, creative, and relevant learning aligned with the demands of the digital era.

Acknowledgement

The Community Service Program implementation team would like to express its sincere gratitude to Lembaga Penelitian dan Pengabdian kepada Masyarakat (LPPM) UM Bengkulu for the support provided, which enabled this program to be carried out successfully. Appreciation is also extended to SMP Negeri 29 Bengkulu Tengah for their active participation and excellent cooperation, allowing the entire series of activities to run smoothly and provide meaningful benefits in enhancing teachers' competencies and strengthening digital transformation in education.

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