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Empowering PGMI Students in Developing Interactive Mathematics Teaching Materials Based on Digital Books at MIS Al-Jihad Palangka Raya

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Abstract: *Technology development has brought significant changes in education, demanding students' active role as prospective educators to innovate in learning. This article aims to describe the role of Elementary Madrasah Teacher Education (PGMI) students in collaborative community service to develop interactive teaching materials based on digital books in Mathematics subjects in class IV of MIS Al-Jihad Palangka Raya using the ABCD method (Audience, Behaviour, Condition, Degree). The study results showed that the teaching materials developed were feasible (material validation 97%, design 96%), received positive teacher responses (82%), and significantly impacted student learning outcomes. Thus, PGMI students are essential in supporting compelling and engaging digital-based learning innovations.*

Abstrak

Perkembangan teknologi telah membawa perubahan signifikan dalam dunia pendidikan, menuntut peran aktif mahasiswa sebagai calon pendidik untuk berinovasi dalam pembelajaran. Artikel ini bertujuan untuk mendeskripsikan peran mahasiswa Pendidikan Guru Madrasah Ibtidaiyah (PGMI) dalam kegiatan pengabdian masyarakat kolaboratif untuk mengembangkan bahan ajar interaktif berbasis buku digital pada mata pelajaran Matematika di kelas IV MIS Al-Jihad Palangka Raya menggunakan pendekatan metode ABCD (Audience, Behavior, Condition, Degree). Hasil kegiatan pengabdian menunjukkan bahwa bahan ajar yang dikembangkan sangat layak digunakan (validasi materi 97%, desain 96%), mendapatkan respons positif dari guru (82%), serta memberikan dampak signifikan terhadap hasil belajar siswa. Dengan demikian, mahasiswa PGMI berperan penting dalam mendukung inovasi pembelajaran berbasis digital yang efektif dan menarik.

Kata kunci: Mahasiswa PGMI, bahan ajar interaktif, buku digital, metode ABCD, pengembangan pembelajaran

1. INTRODUCTION

In today's digital era, education cannot be separated from the influence of information technology. Technology allows educators, including PGMI students, to create more creative, engaging, and efficient learning (Maritsa et al., 2021). The use of digital-based interactive teaching materials has proven to positively impact student understanding and make the learning process more interesting and interactive. This shows that integrating technology in education helps deliver material, motivates students, and fosters higher interest in learning.

Therefore, systematic efforts are needed to optimize the use of educational technology to ensure that the digital tools used support the effectiveness of classroom teaching. This involves not only selecting and developing appropriate teaching materials but also training educators to use technology effectively and appropriately according to student characteristics. Such efforts will strengthen the learning process and provide a more relevant and enjoyable educational experience, in line with the development of an increasingly digital age (Hapsari et al., 2019).

As prospective teachers, PGMI students are expected to be able to design teaching materials that not only meet curriculum needs but also accommodate the characteristics of today's students who are familiar with technology. Mathematics as a core subject in elementary school is often challenging for students, especially with materials such as flat shapes. Difficulty in understanding abstract concepts is an essential reason for the development of more contextual learning media. This is where PGMI students take on the role of teaching material developers who can bridge between subject matter and student understanding through interactive media based on digital books (Lusianisita & Rahaju, 2020).

This teaching material was developed at MIS Al-Jihad Palangka Raya using the ABCD *(Asset-Based Community Development)* model to analyze the involvement of PGMI students more systematically and measurably. This model emphasises four main aspects in the learning process. First, the *Audience* aspect focuses on who learns, namely students, by paying attention to their characteristics and needs in the learning process. Second, the *behaviour aspect that explains the expected behaviour*, which is the skills or knowledge that students are expected to master after using the teaching materials. Next, the *Condition* aspect looks at the conditions when learning takes place, including existing facilities and how learning media support students' learning experience. Finally, the *Degree* aspect measures the level of success achieved, namely the effectiveness and impact of teaching materials in supporting the achievement of student learning objectives. With this approach, this study aims to provide a more precise and structured picture of the contribution of PGMI students in developing teaching materials that meet the needs of education in the digital era.

2. METHOD

In this study, researchers applied a community service approach using the ABCD *(Asset-Based Community Development)* model. This model emphasises exploring and

utilising the potential and assets owned by the community as the primary basis for the development process. The flowchart of the implementation of activities based on the ABCD model is presented as follows:

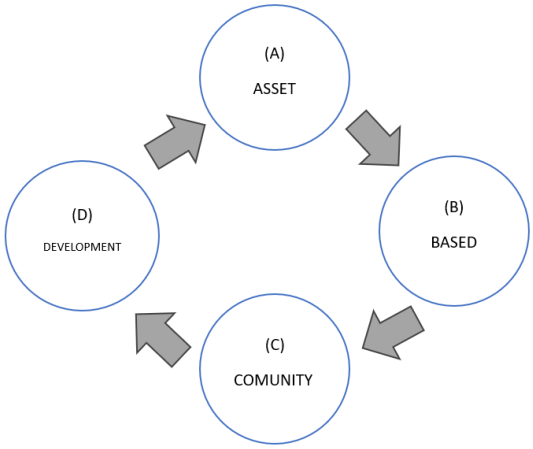

Figure 1. ABCD Method Chart

The ABCD *(Asset-Based Community Development) method was used in this research to design and produce a particular product and test the level of activity of its use in the context of learning. The activity implementation process begins with the Asset and Needs Identification (Assessment & Discovery) stage, which includes in-depth observation of students' needs, potential, and characteristics*. This stage aims to ensure that the product development is genuinely relevant and follows the real conditions in the school environment. (Sumarni & Manurung, 2023).

The ABCD approach is used to analyze the results of the involvement of PGMI students, namely the audience of fourth-grade students of MIS Al-Jihad Palangka Raya. Behaviour: PGMI students develop interactive and engaging digital-based teaching materials. Condition: Development is carried out in schools with limited but functional facilities. Degree Validation of teaching materials by material experts (97%), design experts (96%), teachers (82%), and field test results (84.43%).

3. RESULTS AND DISCUSSION

This study began on Friday, January 17, 2025, and ended on Friday, January 24, 2025, at MIS Al-Jihad Palangka Raya. Mrs. Sartinem, S.Pd., was the homeroom teacher of class IV C, and all students of class IV C were active participants in developing and testing teaching materials.

In its implementation, researchers used the ABCD method, which focuses on mapping and utilizing the assets or potential owned by the school community to support the program's success. This approach was chosen to ensure that the process of developing digital teaching materials is collaborative, contextual, and rooted in the local strengths that exist in the school environment.

The role of PGMI students in developing interactive teaching materials based on digital books is crucial in answering the challenges of 21st-century learning. They implement educational programs and act as agents of change and innovators who can design learning media that are contextual, interesting, and in accordance with students' needs.

In the Audience aspect, the development of teaching materials is focused on grade IV students, dominated by visual and kinesthetic learning styles. Students can develop adaptive teaching materials in terms of communicative language, attractive visual displays, and interactive presentation of material. This shows that PGMI students understand students' characteristics and can translate these needs into applicable and effective digital teaching materials to support a fun and meaningful learning process (Salsabila & Agustian, 2021).

In behaviour, PGMI students show creativity when designing digital teaching material. This is reflected through integrating various interactive elements, such as QR codes connected to additional learning resources and learning videos that strengthen student understanding visually and audibly. In addition, students also compile storyboards and flowcharts as systematic guides to direct the flow of material presentation. Using these two tools allows teaching materials to be structured and logical, so the learning process becomes more directed, interactive, and follows the stages of student thinking. This innovation shows that students focus on content and pay attention to instructional design, which can increase learning effectiveness (Syabrina & Sulistyowati, 2020).

Figure 2. Book Cover

Regarding the condition, the limited facilities available in the school environment are not an obstacle for PGMI students in developing teaching materials. Instead, this condition encourages them to be more creative and innovative in utilizing the simple digital media available. Despite limited resources, students can still produce high-quality digital teaching materials in content, appearance, and interactivity.

The quality of this teaching material is proven through the validation results by experts, which show an excellent assessment and support the feasibility of using teaching materials in learning. This proves that with the right approach and optimal utilisation of local assets, limited facilities are not a barrier to creating meaningful learning innovations (Sholikhah et al., 2022).

Interactive teaching materials based on digital books developed by PGMI students show the following results:

1. Expert validation: The teaching materials were rated as "very feasible" by the material experts (97%) and design experts (96%).
2. Teacher assessment: The class teacher gave a feasibility score of 82%.
3. Field trial: The feasibility score reached 84.43% from 27 students involved.

In the Degree aspect, the effectiveness of the teaching materials developed is proven to positively impact the learning process. The trial results show that the teaching materials are effective to use, characterized by increased student participation, active involvement in learning activities, and understanding of the material presented.

The use of interactive digital teaching materials also creates a more enjoyable, interesting, and meaningful learning atmosphere for students. This indicates that the innovations made by PGMI students are not only academically feasible but also able to create learning experiences that are in accordance with their characteristics and needs.

Figure 3: Classroom Activities with Interactive Book

These results indicate that developing interactive teaching materials based on digital books by PGMI students is theoretically feasible, but also applicable and effective when applied in the field. Validation provided by material experts and design experts indicates

that this teaching material has met pedagogical and aesthetic standards in accordance with effective learning principles in terms of content and visual appearance.

The assessment given by the fourth-grade teacher further strengthens the idea that this teaching material is tailored to the needs and characteristics of students. Teaching materials are considered relevant in content, interesting in terms of presentation, and can increase student interest and involvement in the learning process. Thus, this teaching material is not only an auxiliary learning medium but also a means to create a more dynamic, interactive and enjoyable learning atmosphere.

In addition, the field trial, which resulted in a feasibility score of 84.43%, is strong evidence that the digital teaching materials developed can have a tangible impact on improving students' understanding of the material, especially in Mathematics. This increase in learning outcomes shows that using digital-based learning media fosters student interest in learning, increases interactivity, and helps students understand abstract concepts in a more concrete, visual, and fun way.

This success is inseparable from the active involvement of PGMI students in all stages of development, from needs analysis, design, media production, trials, and evaluation. This involvement reflects that students' role is not only technical but also touches on pedagogical and reflective aspects, which prioritize understanding of student characteristics and the dynamics of the learning process.

By applying the ABCD *(Asset-Based Community Development) method and integrating the ADDIE instructional development model (Analysis, Design, Development, Implementation, Evaluation), students can develop systematic, data-based learning strategies that are responsive to schools' context and needs*. This shows that PGMI students have great potential as educational innovators who can make a real contribution to improving the quality of learning in elementary schools.

More broadly, the development of this teaching material contributes significantly to increasing students' capacity as future professional educators. Through this process, students are trained to think critically, innovate, collaborate, and develop solutions relevant to educational challenges in the digital era. The experience equips them with much-needed skills to deal with the dynamics of the ever-evolving world of education and strengthens their readiness to integrate technology and effective pedagogy in the learning process.

Thus, the results obtained from the development of these teaching materials not only positively impact improving the quality of learning at MIS Al-Jihad Palangka Raya, but also provide a good practice model that can be replicated in other madrasahs or schools.

This shows that efforts to develop digital-based teaching materials can strategically encourage a more inclusive and sustainable transformation of basic education. This kind of approach can serve as a reference for educational institutions in facing the challenges of changing times that are increasingly dependent on technology, as well as ensuring that all students get more relevant and enjoyable learning.

4. CONCLUSIONS AND SUGGESTIONS

PGMI students have made a significant contribution to the development of interactive teaching materials based on digital books. Through the ABCD method approach and the ADDIE model, they successfully designed teaching materials that are relevant, feasible, and effective for use in learning mathematics in class IV of MIS Al-Jihad Palangka Raya. For students, improve the ability of technology and teaching media design. For Educational Institutions: Provide training and practice support facilities. For Teachers and Schools: Integrate digital teaching materials into learning regularly.

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