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Development of Book Creator Learning Media to Improve Understanding of Science Learning

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ABSTRACT. This study aimed to develop and evaluate the feasibility, practicality, and effectiveness of Book Creator-based learning media to improve fifth-grade students' understanding of science concepts at SD IT Al Khair Lampung. The study employed a Research and Development (R&D) approach adapted from the Borg and Gall model, encompassing needs analysis, product design, expert validation, revisions, small-group trials, and field testing. Data were collected through observations, interviews, questionnaires, and learning achievement tests involving 13 fifth-grade students, three media experts, three material experts, and five teachers. The developed media integrates text, images, instructional videos, concept maps, summaries, and evaluation activities within an interactive digital book format aligned with the 2013 Curriculum. Validation results indicated that the media was highly feasible, with average scores of 82.84% for media layout quality, 82.86% for instructional delivery, and 81.91% for content presentation. Small-group trials yielded a positive response rate of 81.00%, while teacher and student responses reached 82.00% and 79.80%, respectively. The effectiveness analysis demonstrated an improvement in students' learning outcomes, with mean scores increasing from 71.38 in the pre-test to 82.08 in the post-test and an N-Gain score of 61.56%, categorized as moderately effective. These findings suggest that Book Creator-based media can serve as an innovative and engaging instructional tool to enhance science learning in elementary schools.

Keywords: *Book Creator, Digital Learning Media, Science Learning, Elementary Education.*

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INTRODUCTION

The rapid advancement of digital technology has transformed educational practices, encouraging greater integration of interactive learning media. In elementary education, visual and interactive media are particularly important for sustaining young learners' attention and facilitating understanding of abstract science concepts. Technology-enhanced science learning can increase students' engagement, interest, and ability to connect scientific concepts with everyday experiences (Ginzburg & Barak, 2023). Therefore, teachers need to integrate

appropriate digital media into science instruction to make learning more contextual, interactive, and meaningful (Wu et al., 2023).

Elementary school students at SD IT Al Khair Lampung face challenges in understanding natural science materials, particularly because learning remains largely teacher-centered. Preliminary observations indicate that students often experience boredom and limited engagement when dealing with complex or abstract scientific concepts, which may affect their learning outcomes. Digital learning materials offer a promising alternative by providing more interactive and contextual learning experiences. Parinduri et al. (2022) found that digital science modules were feasible and effective in improving learning outcomes among Islamic elementary school students. Similarly, Bachri et al. (2024)demonstrated the potential of digital modules to support contextual and meaningful learning in elementary education. Therefore, integrating interactive digital modules into student-centered science learning can help bridge abstract concepts with students' learning experiences while enhancing engagement and understanding.

One of the promising digital platforms for developing interactive learning media is Book Creator. Its user-friendly interface enables teachers to design contextualized e-books that integrate text, images, audio, video, and interactive activities, thereby providing multimodal learning experiences. Research has shown that Book Creator can support students' language development, digital literacy, and engagement by combining visual, auditory, and interactive elements in a single learning environment (Spaliviero, 2022). Evidence from elementary education also indicates that Book Creator-based digital modules can provide feasible and interactive learning materials and support students' learning activities (Ayuni & Fadlan, 2023; Muhisom et al., 2023). Thus, Book Creator can transform conventional reading into a more interactive and exploratory learning experience while enabling teachers to adapt materials to students' specific learning needs and classroom contexts.

Understanding science concepts deeply is essential for elementary students to develop scientific literacy and build a strong foundation for future learning. Science education should therefore move beyond factual memorization toward active exploration, visualization, and meaningful knowledge construction. Digital media such as Book Creator can support this process by integrating text, images, animation, video, and interactive activities that make abstract or complex scientific phenomena more accessible to young learners. Research on interactive e-books has shown that multimedia-based digital materials can enhance students' conceptual understanding and promote more active, student-centered learning (Septikasari et al., 2021). Similarly, interactive e-books developed for science learning have demonstrated positive effects on students' concept mastery and learning outcomes (Harjono et al., 2020). Thus, the integration of interactive digital books such as Book Creator represents a promising approach for strengthening conceptual understanding while simultaneously fostering scientific literacy among elementary school students.

Developing customized learning media specifically for SD IT Al Khair Lampung provides a highly localized response to broader challenges in educational digitalization. Rural and semi-urban schools may face disparities in digital infrastructure, technology use, and teachers' digital competence compared with urban schools (Kormos & Wisdom, 2023; Lin et al., 2023). In Indonesia, regional digital inequalities are particularly evident between metropolitan and rural or peripheral areas (Kartiasih et al., 2023). Therefore, developing a Book Creator module aligned with the local curriculum and students' immediate environment can enhance the relevance and accessibility of digital learning materials. Beyond improving students' learning outcomes, such development can also support teachers' digital competence and provide a more sustainable pathway for technology integration in elementary education.

Based on the issues outlined above, a structured research and development study is essential to address these educational needs. The primary objective of this study is to design,

develop, and test the validity and effectiveness of a Book Creator-based learning media. It focuses specifically on natural science subjects to evaluate how much the media improves students' conceptual understanding. Through rigorous development phases, this interactive media is expected to provide an engaging, self-paced learning tool for students. It will also serve as an innovative teaching reference for educators striving to modernize their instructional methods. Thus, this study introduces a novel approach titled "Development of Book Creator Learning Media to Improve Understanding of Science Learning at SD IT Al Khair Lampung."

METHOD

This study employed a Research and Development (R&D) approach aimed at developing and validating an educational product through systematic procedures. In educational research, R&D is commonly used to develop instructional media and learning resources that are subsequently validated and tested for their practicality and effectiveness (Waruwu, 2024; Ade Rahayu, 2025). The product developed in this study was a Book Creator-based learning medium for Grade V Science (IPA) at SD IT Al Khair Lampung, designed to support students' understanding of science concepts. The relevance of Book Creator as a digital learning medium for elementary science learning has also been demonstrated in recent development studies (Sakti & Purwowidodo, 2024; Pausa & Zainil, 2023).

The development procedure was based on the Borg and Gall model, with modifications to suit the scope and context of the present study. Borg and Gall provides a systematic sequence of research, product development, validation, field testing, revision, and implementation, making it appropriate for the development of educational media (Mahmudah et al., 2021). The model was adapted following the research and development procedures commonly applied in Indonesian educational research, including modifications described in Sugiyono's R&D framework.

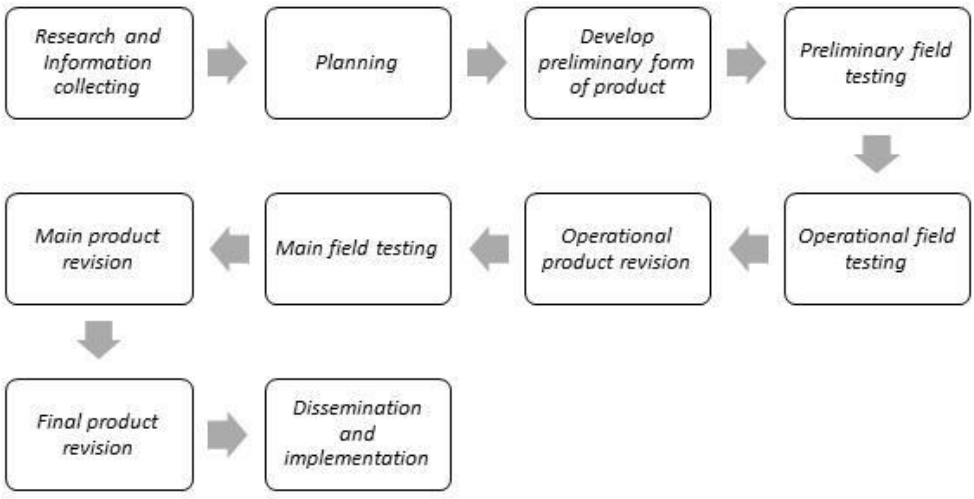


Figure 1. Development Design

The development steps generally include: (1) research and data collection, (2) planning, (3) initial product development, (4) expert validation, (5) product revision, (6) small group trial, (7) field trial, (8) final revision, and (9) dissemination.

The study was conducted at SD IT Al Khair Lampung, with Grade V students as the main research subjects. The research participants involved media experts (lecturers in instructional media), material experts (science teachers or lecturers), and Grade V students as the users of the developed Book Creator learning media. These participants were involved to ensure that the product was valid in terms of both content and design, as well as appropriate for classroom use. The data collected in this study consisted of qualitative and quantitative data. Qualitative data included comments, suggestions, and interview results, while quantitative data included validation questionnaires, user responses, and learning achievement test results. The data were collected using several instruments, namely non-participant observation, interviews, questionnaires using Likert and Guttman scales, and learning achievement tests to measure students' understanding after using the developed media.

Data analysis was conducted using descriptive qualitative and quantitative methods, including:

1. Media Feasibility Analysis (*Likert Scale*)

Tabel 1. Scores were converted into feasibility categories:

Score	Category
4.21 – 5.00	Very Feasible
3.40 – 4.20	Feasible
2.60 – 3.39	Fairly Feasible
1.79 – 2.59	Less Feasible
≤ 1.78	Very Poor

2. Effectiveness Analysis (N-Gain Score)
   Used to measure learning improvement:
   $g > 0.7$ = High
   $0.3 \leq g \leq 0.7$ = Medium
   $g < 0.3$ = Low
3. Teacher and Student Response Analysis
   Using the Guttman scale (Yes = 1, No = 0) to determine practicality of the media.

Tabel 2. Instrument Indicators (Summary)

Aspect	Indicators
Media	design, color, usability
Content	curriculum alignment, structure, completeness
Evaluation	test items and learning comprehension

Overall, this R&D method is used to produce a valid, practical, and effective Book Creator learning media to improve Grade V students' understanding of Science at SD IT Al Khair Lampung.

RESULT AND DISCUSSION

Result

Education is an essential instrument for improving human quality and building national civilization, as implicitly guided by religious principles and state regulations like Indonesian Law No. 20 of 2003. Within the elementary school curriculum, Natural Science (IPA) plays a pivotal role by focusing on factual natural phenomena and problem-solving through scientific research. However, observational findings at SD IT Al Khair Lampung revealed that traditional science

teaching methods lack variation, relying heavily on dense conventional textbooks and teacher-centric explanations. This conventional approach results in passive student engagement and low enthusiasm during learning sessions. Consequently, a preliminary assessment (pre-test) in the fifth-grade class showed that 8 out of 13 students failed to meet the Minimum Mastery Criteria (KKM).

Table 3. Pre-test Outcomes at SDN 2 Prayungan

Status	Number of Students
Completed (>= 75)	5
Incomplete (< 75)	8

To resolve this issue, integrating instructional technology through interactive digital books provides a promising pedagogical alternative. Digital platforms like Book Creator allow educators to design highly engaging textbooks by embedding audio, video, and text elements smoothly. Compared to conventional printed books, electronic resources foster self-paced, flexible learning that can be accessed anytime and anywhere. Therefore, this study emphasizes developing a Book Creator-based digital media platform to enhance science learning comprehension for fifth-grade students at SDN 2 Prayungan.

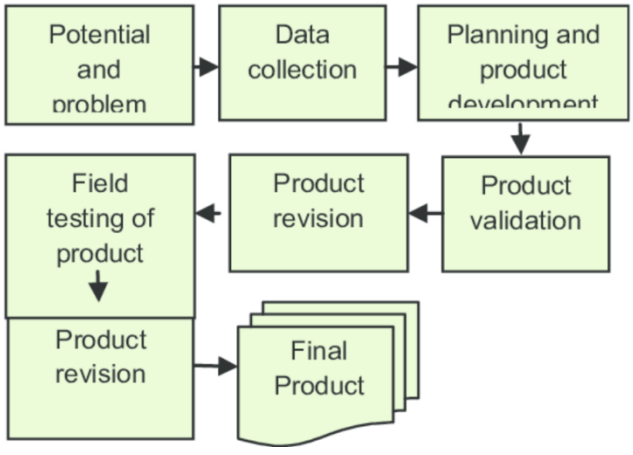
This study employed a Research and Development (R&D) methodology based on the comprehensive Borg and Gall model. The adopted development procedures consisted of systematic steps including initial research, data collection, instructional design, expert validations, revisions, and field trials. Data collections were carried out through qualitative and quantitative techniques consisting of non-participant observation, structured teacher interviews, Guttman-scaled questionnaires, and targeted test items. Instrument testing involved 13 fifth-grade students to measure validity and internal consistency. The reliability index was evaluated using statistical formulas:

Table 4. The reliability index

Reliability Statistics	
Cronbach's Alpha	N of Items
.768	15

This statistical value confirmed that all the evaluation instruments were highly consistent and appropriate for field data acquisition.

Figure 2 Modified Borg and Gall R&D Workflow Diagram



The pedagogical framework targets transforming abstract science themes in the second semester of the fifth grade into concrete instructional units. The content covers four core themes: Theme 6 (Heat and its Transfer), Theme 7 (Events in Life), Theme 8 (Our Friend the Environment), and Theme 9 (Substances Around Us). This interactive platform is specifically tailored to fit the Curriculum 2013 requirements. The ultimate goal is to move beyond passive rote memorization toward master learning principles where students synthesize new concepts independently.

The architectural design of this media was created online using the Book Creator workspace on its official app platform. Structurally, the interactive digital book contains essential components: front cover, author profile, concept maps, core competencies, instructional videos, brief summaries, and evaluation links. It serves as a visual learning aid that accommodates different learning styles, such as auditory, visual, and kinesthetic types. The system uses highly interactive functions to encourage active student participation rather than passive reading.

The interface displays structured, colorful cover options designed for fifth graders.



Theme 6: Heat and Its Transfer



Theme 7: Events in Life



Theme 8: Our Friendly Environment



Theme 9: Objects Around Us

Halaman Materi / Instructional Content View It provides a structured display containing core content summaries, diagrams, and illustrative video windows. For example, in the Heat Transfer section, the system embeds videos showing daily life phenomena like real-world railway tracks and overhead electrical lines.

And before entering field testing, the initial product went through validation by three media experts and three content experts to evaluate its quality. The evaluation criteria used a 5-

point Likert scale to gauge technical layout and content structure. The compiled appraisal data from the expert committees are detailed in the comparison matrix below:

Table 5. Validation

Validation Criteria	Expert Reviewer 1	Expert Reviewer 2	Expert Reviewer 3	Composite Average
Media Layout Quality	80.00%	74.29%	94.26%	82.84% (Very Worthy)
Instructional Delivery	85.71%	71.43%	91.43%	82.86% (Very Worthy)
Content Presentation	74.29%	77.14%	94.29%	81.91% (Very Worthy)
Syllabus Alignment	80.00%	71.43%	77.14%	76.19% (Worthy)

Following expert reviews, a small-group trial with 4 students scored an average of 81.00% (Good), confirming clear font readability and smooth interface performance.

Table 6. Media Refinement Actions

Found Limitations	Implemented Correction Actions
Mismatched cycle graphics	Replaced with precise evaporation cycle diagrams
Lacked real-world examples	Embedded practical illustrations of heat expansion
Missing references	Inserted digital source credentials and YouTube credits

The empirical effectiveness of this digital tool was determined by analyzing teacher and student responses alongside learning outcomes. Survey feedback from 5 school instructors yielded an approval rating of 82.00%. Meanwhile, feedback from 13 students showed a satisfaction rate of 79.80%, showing high interest in using Book Creator for future science sessions. The quantitative comparison of pre-test and post-test values using the standard normalized gain formula is presented below:

Table 7 Final Results

Assessment Indicator	Average Score	Percentage (%)	Effectiveness Category
Pre-test Score	71.38	-	-
Post-test Score	82.08	-	-
N-Gain Score	-	61.56%	Moderately Effective

The data showed a 15% increase in conceptual understanding, moving student performance past the KKM threshold. By integrating reading, writing, listening, and viewing elements, the platform keeps students engaged and motivated. Ultimately, this software proves to be a viable and useful digital tool for primary school science education.

Discussion

The findings of this study indicate that science learning at SD IT Al Khair Lampung was still dominated by teacher-centered approaches and printed textbooks, resulting in limited student participation and unsatisfactory learning outcomes. The pre-test data showed that only five of the thirteen students achieved the Minimum Mastery Criteria (KKM), while eight remained below the expected standard. This condition is consistent with challenges reported in elementary science education, where teacher-centered instruction and limited student involvement may constrain science learning outcomes and conceptual development (Suprianti et al., 2021; Wahyuningsih et al., 2023). Interactive and technology-supported learning resources are therefore increasingly important for creating more engaging and meaningful science learning experiences. Previous studies have demonstrated that digital books and interactive multimedia can support science literacy, conceptual understanding, student engagement, and learning outcomes in elementary

education (Febrianti, 2021). In this context, the Book Creator-based digital book was developed as an alternative instructional medium to provide a more interactive learning experience and potentially enhance students' engagement and comprehension.

The need for digital learning innovation in primary education has become increasingly significant in the twenty-first century. Digital instructional materials provide opportunities for students to access learning content through multiple representations, including text, images, audio, and video, thereby creating more interactive and accessible learning experiences. Recent research has demonstrated that digital book-based materials can enhance the effectiveness of science learning and support students' learning outcomes in elementary education (Sari et al., 2025; Widanti & Fathurrahman, 2024). In particular, Book Creator-based learning materials have been shown to improve science learning outcomes and receive positive evaluations regarding their feasibility and usability (Widanti & Fathurrahman, 2024). Therefore, the implementation of Book Creator represents a relevant response to technological developments and the learning needs of primary school students.

The present study employed the Borg and Gall research and development (R&D) model to ensure that the digital book was systematically designed, validated, revised, and evaluated. The model provides a structured framework involving needs analysis, product planning and development, expert validation, revision, and field testing, thereby allowing educational products to be progressively refined before implementation (Farindhani & Wangid, 2019). Previous R&D studies have demonstrated that the Borg and Gall framework can support the development of educational products that meet validity, feasibility, and instructional requirements (Widiansyah et al., 2018; Farindhani & Wangid, 2019). Through iterative validation and revision, weaknesses in the initial prototype can be identified and addressed based on expert and field-based feedback. This procedure strengthens the pedagogical and technical quality of the resulting digital book and enhances its readiness for classroom implementation.

The reliability coefficient obtained from Cronbach's Alpha analysis reached 0.768, indicating that the research instruments possessed acceptable internal consistency. Reliability values exceeding 0.70 are generally considered adequate for educational research instruments (Creswell & Creswell, 2018). This statistical evidence confirms that questionnaires, tests, and observation sheets used in this study generated stable and dependable measurements. Reliable instruments are particularly important in development research because they influence the accuracy of product evaluation results. The availability of valid and reliable data also strengthens the credibility of conclusions regarding media effectiveness. Therefore, the reliability analysis supports the trustworthiness of the findings presented in this study.

Another important finding concerns the instructional design embedded within the Book Creator platform. The developed media integrates various components including concept maps, competency indicators, videos, summaries, and evaluation activities. This arrangement reflects the principles of multimedia learning theory proposed by Mayer (2021), which states that students learn more effectively when information is presented through verbal and visual channels simultaneously. The incorporation of videos demonstrating heat expansion and environmental phenomena allows students to connect scientific concepts with real-life experiences. Such contextual learning experiences encourage deeper understanding and facilitate knowledge retention. Consequently, students become more capable of constructing scientific concepts independently rather than merely memorizing information.

The design of the digital book also accommodates diverse learning preferences among elementary students. Visual learners benefit from colorful illustrations and diagrams, auditory learners gain access to explanatory narration and videos, while kinesthetic learners can participate in interactive activities. This finding supports the perspective of (Tomlinson, 2017), who argues that differentiated instructional materials help maximize student learning potential by addressing

individual differences. Flexible access to digital books additionally enables students to review lessons repeatedly outside school hours. Such accessibility contributes to self-regulated learning behaviors and promotes learning autonomy. Hence, Book Creator serves not only as a teaching aid but also as a facilitator of personalized learning experiences.

Expert validation results further confirmed the appropriateness of the developed media. The average score for media layout quality reached 82.84%, instructional delivery obtained 82.86%, and content presentation achieved 81.91%, all categorized as "Very Worthy." Meanwhile, syllabus alignment scored 76.19%, indicating that the product adequately corresponds with Curriculum 2013 standards. These findings are consistent with the study conducted by (Prasetyo et al., 2021), which reported that expert validation is an essential procedure for ensuring instructional quality and curriculum compatibility. Suggestions provided by validators mainly concerned improving illustrations, adding contextual examples, and citing digital resources. Incorporating these recommendations substantially enhanced the overall quality of the media.

The revisions undertaken after expert assessment demonstrate the importance of formative evaluation in educational product development. Incorrect diagrams illustrating the water cycle were replaced with scientifically accurate images, while examples of heat expansion phenomena were expanded using practical illustrations from everyday life. References to external sources and educational videos were also included to increase information credibility. According to (Dick et al., 2015), formative revisions enable developers to identify deficiencies and optimize learning materials before wider implementation. Such improvements help prevent misconceptions and ensure that learners receive precise scientific explanations. Therefore, iterative revision processes contribute significantly to the production of effective digital instructional media.

Small-group testing involving four students generated an average score of 81.00%, which falls within the good category. Students reported that the font sizes were readable, navigation features were simple, and the integrated videos facilitated understanding of science topics. Similar findings were reported by (Rahmawati & Kuswanto, 2020), who concluded that interactive digital books increase learners' interest because they combine entertainment with educational content. Positive responses during limited trials indicate that the developed media possesses adequate usability and practicality for elementary school students. Moreover, students experienced fewer difficulties when accessing learning materials through digital devices. This practicality aspect is essential for ensuring successful implementation in larger classroom settings.

Teacher perceptions also showed a favorable response toward the Book Creator-based learning media. The approval percentage from five teachers reached 82.00%, suggesting that educators considered the media effective, practical, and relevant to classroom needs. Teachers recognized that digital books could reduce their dependence on verbal explanations and support more student-centered instructional approaches. This finding is consistent with previous research showing that teachers generally perceive digital educational resources positively and recognize their potential to support instructional practice and technology integration (Bond, 2020). Positive teacher acceptance is crucial because educators function as key decision-makers in integrating technological innovations into instructional practice. Consequently, strong teacher support increases the likelihood of sustainable media utilization.

Student responses similarly reflected a high level of acceptance, with an average satisfaction rate of 79.80%. Most learners expressed enthusiasm toward using digital books because they contained attractive colors, videos, and interactive activities. Student motivation is widely recognized as one of the primary determinants of academic achievement. According to Ryan & Deci (2020), engaging learning environments foster intrinsic motivation, which subsequently influences persistence and learning performance. The ability of Book Creator to combine reading, listening, viewing, and responding activities appears to stimulate students' curiosity and

participation. Therefore, the developed media successfully created a more enjoyable and meaningful science learning atmosphere.

The effectiveness analysis based on normalized gain scores demonstrated a moderate improvement in students' conceptual understanding. The average pre-test score increased from 71.38 to 82.08 in the post-test, while the N-Gain percentage reached 61.56%. These results indicate that the digital book contributed positively to students' mastery of science concepts and enabled them to exceed the KKM benchmark. Similar outcomes were documented by (Hidayat et al., 2023), who found that multimedia-based learning resources significantly improve science achievement among elementary school students. The improvement observed in this study can be attributed to the interactive nature of the media, which encourages students to actively process information. Thus, Book Creator has proven effective in supporting science instruction at the primary education level.

The findings of this research reinforce the theoretical assumption that meaningful learning occurs when learners actively construct knowledge through rich multimedia experiences. Interactive digital books allow students to observe scientific phenomena, receive immediate explanations, and revisit concepts whenever necessary. Such learning conditions correspond with constructivist perspectives emphasizing student engagement and knowledge construction . Although the effectiveness category remained moderate, the increase in learning outcomes demonstrates substantial educational benefits. Future studies may involve larger samples and experimental designs to compare Book Creator with other digital learning platforms. Overall, this study confirms that Book Creator-based digital media represents a feasible, practical, and effective innovation for improving elementary science education.

CONCLUSION

The development of Book Creator-based digital learning media proved to be feasible, practical, and moderately effective in improving fifth-grade students' science learning outcomes at SD IT Al Khair Lampung. Expert validation results categorized the media as worthy for classroom implementation, while teacher and student responses indicated positive acceptance and high learning interest. The use of multimedia elements, including videos, illustrations, summaries, and interactive activities, successfully facilitated students' understanding of abstract scientific concepts and promoted more active participation during learning. The effectiveness analysis showed an increase in students' achievement, as reflected by the rise in mean scores from 71.38 in the pre-test to 82.08 in the post-test and an N-Gain value of 61.56%, which falls into the moderately effective category. These findings suggest that Book Creator can serve as an innovative instructional medium that supports student-centered learning and enriches science education in elementary schools. Future studies are recommended to involve larger samples and experimental research designs to further examine the long-term impact of digital book utilization on students' academic performance and learning motivation.

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