

Development of Interactive Learning Media Using Canva for Teaching Sequences and Series in Senior High School

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Abstrak

Penelitian ini bertujuan untuk mengembangkan dan mendeskripsikan kelayakan dan kepraktisan media pembelajaran interaktif berbasis Canva untuk topik Barisan dan Deret dalam matematika SMA. Penelitian ini menggunakan pendekatan Penelitian dan Pengembangan (R&D) dengan model 4D (Definisikan, Rancang, Kembangkan, Sebarkan), yang terbatas pada tahap Kembangkan. Subjek penelitian terdiri dari pakar media, pakar materi, dan siswa kelas sepuluh sebanyak 3 siswa untuk validasi dan 12 siswa untuk kepraktisan. Data dikumpulkan melalui kuesioner validasi dan kepraktisan serta dianalisis secara kuantitatif menggunakan skala Likert. Hasil validasi menunjukkan bahwa media tersebut memperoleh nilai rata-rata 3,67 dari pakar media, 3,50 dari pakar materi, dan 3,67 dari siswa, semuanya dikategorikan sangat layak. Tes kepraktisan juga menunjukkan kategori sangat praktis, dengan nilai 3,42 (pakar media), 3,92 (pakar materi), dan 3,70 (siswa). Aspek yang paling menonjol adalah struktur dan daya tarik, yang menunjukkan bahwa media tersebut tidak hanya menarik secara visual tetapi juga praktis dalam meningkatkan pemahaman konsep dan motivasi belajar siswa.

Kata Kunci: Barisan dan Deret; Canva; Media Pembelajaran Interaktif.

Abstract

This study aims to develop and describe the feasibility and practicality of an interactive learning media based on Canva for the topic of Sequences and Series in senior high school mathematics. The research employed a Research and Development (R&D) approach using the 4D model (Define, Design, Develop, Disseminate), limited to the Develop stage. The subjects consisted of a media expert, material experts, and tenth-grade students as many as 3 students for validation and 12 students for practicality. Data were collected through validation and practicality questionnaires and analyzed quantitatively using a Likert scale. The validation results showed that the media obtained an average score of 3.67 from the media expert, 3.50 from the material experts, and 3.67 from the students, all categorized as very feasible. The practicality test also indicated a very practical category, with scores of 3.42 (media expert), 3.92 (material experts), and 3.70 (students). The most prominent aspects were structure and attractiveness, indicating that the media is not only visually engaging but also practically in enhancing conceptual understanding and students' learning motivation.

Keywords: Sequences and Series; Canva; Interactive Learning Media.

I. INTRODUCTION

Mathematics learning at the senior high school level plays an important role in developing students' logical, systematic, and analytical thinking skills. However, it cannot be denied that many students still experience difficulties in understanding mathematical concepts, particularly those that are abstract in nature, such as sequences and series. This topic requires students to be able to identify patterns, use formulas, and perform calculations systematically, which often leads to learning challenges and causes students to become passive during the learning process (Sari, 2024).

To address these challenges, teachers need to implement innovations in the learning process, one of which is through the use of engaging and easily accessible learning media. Research into the development of digital technology learning media is still an interesting study in solving problems and challenges faced in the field of education, especially mathematics learning (Ramlah et al, 2025). Along with the advancement of information technology, various learning approaches that utilize audio, visual, and interactive principles have emerged. Properly designed interactive media can increase students' learning motivation, because the compatibility between media and learning needs significantly influences the effectiveness of the learning experience (Putra et al., 2024). In the context of education, learning motivation is an essential factor that encourages students' enthusiasm in participating in the learning process. Various types of interactive media, such as quizzes, simulations, and

animations, have been proven effective in improving student motivation and learning outcomes (Rusnia & Suriani, 2025).

One of the potential learning media to be developed is Canva, an online graphic design platform that provides various visually appealing and easy-to-use features. Canva allows teachers to present sequences and series material in the form of infographics, short animations, or visual presentations (Rahmadhani et al., 2024). This visual representation assists students in understanding patterns and concepts more concretely and enjoyably. In addition, Canva also encourages learning motivation and promotes student creativity (Putra et al., 2024).

The use of Canva-based learning media is expected to increase student engagement, clarify the concepts being taught, and facilitate mastery of sequences and series material through a communicative visual approach. This aligns with the findings of Tanjung and Faiza (2019), who state that one of Canva's advantages lies in its ease of use in creating various graphic designs such as presentations, infographics, e-book covers, videos, and animated concept maps, which can be accessed via smartphone without requiring a laptop. This feature also supports differentiated learning, as materials can be adjusted to students' learning styles and needs.

Although Canva has been widely used as a learning medium in mathematics education, its application is mostly limited to visual presentation and general engagement. Research that specifically develops Canva-based interactive media for the topic of Sequences and Series is still

scarce, despite the abstract and pattern-based nature of this topic. This study addresses this gap by designing an interactive Canva-based learning medium that emphasizes pattern recognition, conceptual understanding, and immediate feedback, offering a more innovative approach compared to existing static learning media.

In addition, the study conducted by Octavyanti and Wulandari (2021) shows that the application of interactive digital learning media significantly improves students' enthusiasm and understanding of mathematical concepts. Likewise, research by Malo et al. (2025) concludes that utilizing Canva as a creative and interactive learning medium can improve students' academic performance by creating a more engaging learning environment. As a result, students become more confident, more active in asking questions, and better able to maintain concentration during learning.

Based on these considerations, this article aims to discuss the development and implementation of Canva-based interactive learning media as an effort to enhance students' mathematics learning outcomes on sequences and series in senior high schools. It is expected that the use of creative and pedagogically relevant media will support more effective, interactive, and meaningful mathematics learning for students.

II. METHOD

This study employed a Research and Development (R&D) approach aimed at producing, developing, and validating a product so that it can be used to improve

the quality of education and learning effectively. According to Sugiyono (2014, in Mudhakhir et al., 2023), research and development is a research method used to produce a specific product and test its effectiveness. This study was conducted in the odd semester of the 2025/2026 academic year in a Grade X class in West Java.

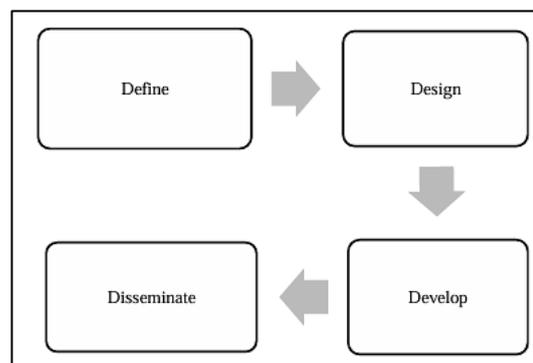


Figure 1. Four-D Model (4D) Development Stages.

This study implemented the 4D development model, which consists of four stages: Define, Design, Develop, and Disseminate (Waruwu, 2024). However, the study was limited to the Develop stage.

1. Define

This stage involved analyzing curriculum requirements, students' learning characteristics, and difficulties related to sequences and series. The analysis indicated that interactive media was needed to support meaningful learning.

2. Design

The researcher designed Canva-based interactive learning media, including the selection of materials, types of activities, and formatting.

3. Develop

a. Description of the Media Prototype

The developed media prototype consisted of 15 slides/pages, organized

into several sections: introduction and learning objectives, conceptual explanations of sequences and series, worked examples, instructional videos, and interactive quiz sections.

The interactivity provided in the media included multiple-choice quizzes and click-based question-and-answer activities, where students selected one of the available answer options. Immediate visual feedback was provided to indicate correct or incorrect responses. The media did not include drag-and-drop or simulation features; instead, it emphasized quiz-based interactivity that supports self-assessment and reflection.

b. Participants

The participants involved in the development stage were Grade X students with heterogeneous academic abilities, categorized as high, medium, and low based on their mathematics achievement as reported by the teacher.

The validation trial involved three students selected to represent different academic ability levels. This stage aimed to obtain initial feedback on the clarity, readability, and comprehensibility of the media.

The practicality trial was conducted through a small-group trial involving 12 students. Most participants had basic experience using Canva, mainly for creating simple presentations or visual assignments, but had not previously used Canva-based media as an interactive learning tool in mathematics. This condition ensured that the practicality evaluation

reflected realistic classroom implementation.

c. Research Instruments

The validation questionnaire focused on evaluating content clarity, suitability of examples, and visual design. Sample items included: The explanation of sequence patterns in the media is clear and easy to understand, the examples provided help me determine the next term in a sequence, etc.

The practicality questionnaire aimed to assess ease of use, attractiveness, and usefulness of the media. Sample items included: The Canva-based learning media is easy to use during the learning process, the interactive quizzes help me check my understanding of Sequences and Series, etc.

4. Disseminate

This stage was not carried out in this study.

III. RESULT AND DISCUSSION

A. Result

This study was conducted based on the need for interactive learning media that can help students understand the topic of arithmetic sequences and series, which are often considered abstract and difficult in mathematics learning. To address this challenge, the research was carried out in a senior high school in West Java with a sample of Grade X students. One of the alternative solutions proposed is the use of Canva, as it provides visual design features, embedded instructional videos, and interactive quizzes that enhance students' engagement and understanding. Fitriana et al. (2024) stated that Canva is effective for learning because it offers visually appealing

and easily accessible media. Furthermore, they emphasized that the use of Canva supports the improvement of students' mathematical skills through creative and interactive presentation of materials.

Previous studies on arithmetic sequences and series have generally utilized other applications such as Android-based media developed using App Inventor 2, which were proven valid, practical, and effective (Angriani et al., 2020). However, studies specifically focusing on developing Canva-based media for this topic remain limited. Therefore, this research aimed to describe the validity and practicality of Canva-based learning media for arithmetic sequences and series. This study applied the 4D development model (Define, Design, Develop, and Disseminate) as proposed by Thiagarajan, Semmel, and Semmel (1974), but was limited to the Develop stage. The main focus was to design Canva-based interactive learning media that align with students' needs and curriculum requirements by integrating instructional videos and interactive quizzes to enhance students' engagement and learning experience.

1. Define Stage

The Define stage served as the initial phase of development, aiming to identify and analyze learning needs in depth. The researcher analyzed the existing curriculum, particularly the basic competencies and learning outcomes related to arithmetic sequences and series for Grade X students. In addition, student characteristics and common difficulties in understanding key concepts—such as identifying the n -th term, distinguishing

between sequences and series, and calculating the sum of n terms—were also analyzed through literature review, document analysis, and classroom observation. The results of this stage provided the foundation for designing media that meet students' needs and support the achievement of curriculum goals.

2. Design Stage

The design stage involved several key activities:

a. Selection of Media and Material

Canva and PowerPoint were selected as the main tools for developing the instructional media. The material covered basic concepts of arithmetic sequences and series, worked examples, video explanations, and interactive quiz exercises. The content was structured according to Grade X learning objectives, presented systematically from simple to complex concepts. Drafts were discussed with experts and colleagues to ensure curriculum alignment and student relevance. Quiz items were designed with varying difficulty levels as part of formative assessment.

b. Media Format Selection

The researcher designed the structure, layout, and type of student activities. The visual design integrated text, images, and animations to make the learning process more engaging and motivating.

c. Initial Media Design

The initial media prototype was created using Canva, complete with instructional icons and navigational elements. Additionally, PowerPoint-based

instructional videos were embedded to strengthen visual explanations.

3. Develop Stage

The researcher created the initial media design by developing the Canva layout and adding instructional icons as the preliminary framework for the Canva-based interactive learning media. In addition, the researcher produced an instructional video using PowerPoint by incorporating the learning material into the slides and designing them accordingly.



Figure 2. Main Display of the Interactive Learning Media.

In addition, the researcher arranged the content of the arithmetic sequences and series material by incorporating an instructional video, with the aim of influencing student learning outcomes. This aligns with the findings of Ponza et al. (2018), who stated that animated instructional videos have a significant effect on improving students' learning outcomes. The following is an example of the embedded instructional video display.



Figure 3. Student Quiz Interface.

Figure 3 illustrates an interactive quiz interface in which students respond by

selecting one of the multiple-choice options displayed on the screen. During the development process, the researcher consulted regularly with experts to ensure that the content, presentation flow, and visual design were aligned with the curriculum and students' learning needs. The developed media was then evaluated by material experts and media experts to assess the suitability of the content, construct, and language aspects (Effendi et al., 2018), including visual appearance, presentation, language clarity, content accuracy, and alignment with learning objectives. The practicality assessment also involved students as users to obtain feedback regarding accessibility, visual design, and the usefulness of the media in supporting improved learning outcomes.

The feedback from the validators and users was used as the basis for revising the media to make it more feasible, interactive, and user-friendly. The validity and practicality assessments were conducted using Likert-scale questionnaires, with the resulting scores analyzed to determine the feasibility and practicality levels of the Canva-based learning media in mathematics instruction. The scoring procedures were evaluated according to the following Table 1.

Table 1.
Media Expert Validation Assessment

Aspect	Number of Item	Average per Item	Interpretation
Content	5	3.60	Very Feasible
Construct	5	3.80	Very Feasible
Language	5	3.60	Very Feasible
Overall Average	15	3.67	Very Feasible

After the scores were obtained, the evaluations were processed using a scale conversion formula to quantitatively

determine the level of media feasibility. The results were then analyzed using the scale measurement procedure to establish the validity and practicality of the developed media (Rahmatullah et al., 2020).

The Validity and Practicality Measures

$$= \frac{\sum X_i}{N}$$

Xi = Total Score

N = Number of Respondents

a. Validation Assessment by the Media Expert

The validation was carried out by a media expert who assessed three aspects, namely content, construct, and language (Effendi et al., 2018). Media validation is a process conducted to evaluate the product design by experts with relevant experience (Dewanti, as cited in Hapsari & Zulherman, 2021).

Table 2.
Media Expert Validation Assessment

Aspect	Number of Item	Average per Item	Interpretation
Content	5	3.60	Very Feasible
Construct	5	3.80	Very Feasible
Language	5	3.60	Very Feasible
Overall Average	15	3.67	Very Feasible

From Table 2, the construct aspect was the most prominent, obtaining the highest score of 3.80. This indicates that the sequence of material presentation was considered highly systematic, the interactive activities were aligned with the learning objectives, and the media successfully provided opportunities for students to practice and actively participate. The media expert noted that

the transitions between sections were smooth, the progression from simple to complex concepts followed the principle of scaffolding, and the information was not overly dense, allowing it to remain easy to understand. Therefore, the strength of the media lies in its effective instructional design that supports active student engagement, rather than merely in its visual appearance.

b. Validation Assessment by the Material Expert

The validation assessment by the material experts was carried out by three teachers. The validation focused on three aspects: content, construct, and language (Effendi et al., 2018).

Table 3.
Material Expert Validation Assessment

Aspect	Number of Item	Average per Item	Interpretation
Content	7	3.57	Very Feasible
	7	3.57	Very Feasible
	7	3.7	Very Feasible
Construct	4	3,5	Very Feasible
	4	3.75	Very Feasible
	4	3.5	Very Feasible
Language	4	3.25	Very Feasible
	4	3.75	Very Feasible
	4	3.75	Very Feasible
Overall Average		3.5	Very Feasible

The recapitulation results (see Table 3) show that all aspects were categorized as very feasible. The most prominent aspect was content, which obtained the highest mean score of 3.70. The validators assessed that the material presented was aligned with the learning outcomes and performance indicators, and did not lead to misconceptions. In addition, the teachers appreciated the inclusion of examples and

interactive practice questions, which were considered to encourage students' critical thinking skills. Thus, from the teachers' perspective, the media's strongest feature lies in the quality of its content and its relevance to the curriculum, making it appropriate to be used as an innovative instructional resource.

c. Student Response Questionnaire (Individual Trial / Validation Stage)

The student response questionnaire was administered to three students. In the Student Response Questionnaire section, the questionnaire was administered to three students as part of a limited individual trial aimed at obtaining initial feedback on clarity, readability, and ease of use of the learning materials. The student responses were assessed based on the indicators of readability and clarity (Effendi et al., 2018). The readability and clarity tests conducted with the students also showed very good results.

Table 4. Student Response Questionnaire Assessment

Aspect	Number of Item	Average per Item	Interpretation
Readability	6	3,67	Very Feasible
	6	3.83	Very Feasible
	6	3.67	Very Feasible
Clarity Test	5	3,67	Very Feasible
	5	3.83	Very Feasible
	5	3.83	Very Feasible
Overall Average		3.67	Very Feasible

A deeper analysis indicated that the students perceived the media as easy to understand without additional assistance from the teacher, with simple sentence structures and contextual illustrations (see Table 4). The clarity aspect emerged as the most prominent, as students reported that

the task instructions, variable symbols, and expected outcomes were stated explicitly and were not ambiguous.

d. Practicality Assessment by the Media Expert

The practicality test conducted by the media expert was carried out to assess three key indicators, namely attractiveness, ease of use, and media feasibility (Akker, as cited in Effendi et al., 2019).

Table 5. Media Expert Practicality Assessment

Aspect	Number of Item	Average per Item	Interpretation
Atractiveness	3	3.67	Very Feasible
Ease of Use	3	3,33	Very Feasible
Media Feasibility	4	3.25	Very Feasible
Overall Average	3,33	3,42	Very Feasible

From Table 5, the results indicate that the learning media is categorized as highly feasible and practical for use according to the media expert. The most prominent aspect was attractiveness (3.67). The media expert noted that the visual design, including color selection, layout arrangement, and graphic composition, was appealing and harmonious, aligning well with the characteristics of senior high school students. Additionally, the combination of Canva and PowerPoint was considered effective in supporting the integration of animations and videos without significant technical issues.

The ease-of-use aspect also showed positive results. The media could be accessed on both laptops and smartphones, with straightforward navigation that did not require complex user instructions. Meanwhile, for the feasibility aspect the expert assessed that

the media was sufficiently efficient and relevant to the context of mathematics learning in the classroom. Therefore, from the media expert’s perspective, the main strengths of the media lie in its visually engaging design and the seamless integration between platforms, while technical optimization remains an area for improvement to ensure more efficient use within the limited instructional time.

e. Practicality Assessment conducted by the Material Expert

The practicality assessment by the material experts was carried out by three teachers. The material experts evaluated the practicality of the media based on the same three indicators, namely attractiveness, ease of use, and content feasibility (Akker, as cited in Effendi et al., 2019).

Table 6.
Material Expert Practicality Assessment

Aspect	Number of Item	Average per Item	Interpretation
Attractiveness	3	4	Very Feasible
	3	3.3	Very Feasible
	3	3.3	Very Feasible
Ease of Use	3	3,67	Very Feasible
	3	4	Very Feasible
	3	3.67	Very Feasible
Feasibility	4	3.25	Very Feasible
	4	3.5	Very Feasible
	4	4	Very Feasible
Overall Average		3.92	Very Feasible

Based on these results, all aspects were categorized as very feasible, with attractiveness emerging as the most prominent aspect. The material experts stated that the presentation of arithmetic sequences and series in the media was highly engaging due to the integration of

text, images, and videos that were relevant to real-life contexts. This helped make abstract mathematical concepts more concrete and meaningful. The ease-of-use aspect indicated that the sequence of material presentation was systematic and easy to understand. The language and explanations used in the media were also appropriate for students’ proficiency levels, allowing them to learn independently without constant teacher guidance.

The feasibility aspect demonstrated that the content was well-aligned with the curriculum, basic competencies, and student characteristics. Furthermore, the media supported teachers in achieving learning objectives, particularly in enhancing conceptual understanding and student engagement. Overall, from the perspective of the material experts, the primary strengths of the media lie in its engaging presentation and the alignment of its content with the learning context.

f. Student Response Questionnaire (Practicality Stage)

The practicality of the media from the users’ perspective was assessed based on their direct experiences in using the media during the learning process, as measured through a student response questionnaire. The practicality evaluation was conducted through a small-group trial involving 12 students. The aspects assessed included attractiveness, ease of use, and feasibility (Akker, as cited in Effendi et al., 2019).

Table 7.
Student Practicality Response Assessment

Aspect	Number of Item	Average per Item	Interpretation
Atractiveness	3	3.81	Very Feasible

Aspect	Number of Item	Average per Item	Interpretation
Ease of Use	3	3,64	Very Feasible
Feasibility	4	3,65	Very Feasible
Overall Average		3,70	Very Feasible

The students reported that the colorful and animated visual appearance, along with the use of videos and contextual illustrations, made the learning experience enjoyable and prevented monotony. The media was also perceived to stimulate curiosity and increase motivation to learn mathematics

For the ease-of-use aspect (3.64), students stated that they were able to use the media independently without significant difficulty. Clear usage instructions and a well-structured navigation system helped them follow the learning sequence effectively. The feasibility aspect (3.65) also received a very positive evaluation. Students indicated that the media helped them understand the concepts of sequences and series more easily and that it could be used at any time, both at school and at home.

These findings demonstrate that the developed learning media meets the feasibility criteria comprehensively, in terms of visual design, material presentation, language clarity, and its relevance to the learning objectives. The construct and attractiveness aspects were the most prominent, with the highest scores across all respondent groups. This confirms that the media is not only visually appealing, but also features a systematic learning structure that is easy for students to comprehend.

B. Discussion

Based on the results of the validation and practicality assessments conducted by the media expert, material experts, and students, the Canva-based interactive learning media for the topic of Sequences and Series was classified as highly feasible and highly practical. The average validation scores were 3.67 from the media expert, 3.50 from the material experts, and 3.67 from the students. Likewise, the practicality test yielded scores of 3.42 from the media expert, 3.92 from the material experts, and 3.70 from the students.

These results demonstrate that the developed learning media meets the feasibility criteria comprehensively, including visual design quality, clarity of material presentation, linguistic appropriateness, and alignment with learning objectives. The construct and attractiveness aspects were the most prominent across all respondent groups, indicating that the media not only offers appealing visuals but also presents instructional content in a systematic, coherent, and easily understandable manner.

The findings align with those of Tanjung and Faiza (2019), who reported that Canva is advantageous due to its ease of use in producing diverse educational designs such as presentations, graphics, e-book covers, videos, and animated concept maps that are ready for publication. Moreover, Canva can be operated effectively using mobile devices, without requiring a laptop, thereby increasing accessibility for both teachers and students.

Pedagogically, the media is effective because it integrates visual, auditory, and interactive elements that promote active learner engagement, which in turn can improve learning outcomes. This conclusion is reinforced by the findings of Fitriana et al. (2024) and Malo et al. (2025), which indicate that the use of Canva in instructional settings enhances motivation, conceptual understanding, and academic performance through meaningful visualization and interactive learning experiences. These results are also consistent with Ananda (2017) and Rahmatullah et al. (2020), who emphasize that the appropriate use of instructional media contributes significantly to improving student learning outcomes.

The integration of Canva in learning Sequences and Series facilitated the visualization of abstract numerical patterns and supported students' conceptual understanding through interactive and structured representations of sequence problems.

Furthermore, from the learners' perspective, the media was perceived as supporting independent learning without requiring continuous teacher guidance. This suggests that the Canva-based media fosters self-directed learning, which is a key competence in 21st-century education.

In addition, this study provides several practical recommendations. Teachers are encouraged to utilize this media as an innovative alternative for presenting the concepts of sequences and series in a visual and contextual manner, both in face-

to-face and online learning environments. Schools are advised to support the integration of digital media such as Canva as part of efforts to strengthen technological literacy and foster teacher creativity in developing 21st-century learning. Future researchers are recommended to continue the study to the Disseminate stage and conduct effectiveness testing to empirically examine the media's impact on improving student learning outcomes.

Therefore, it can be concluded that the developed Canva-based interactive learning media fulfills the criteria of feasibility and practicality, and can be effectively implemented in mathematics learning.

Despite the promising findings regarding the validity and practicality of the developed Canva-based learning media, this study has several limitations that should be acknowledged. First, the number of participants involved in the student trials was relatively small, consisting of three students in the validation stage and twelve students in the small-group practicality trial. Therefore, the results cannot be generalized to a broader population.

Second, this study focused only on the development, validation, and practicality of the media and did not examine its effectiveness in improving students' learning outcomes. As a result, the impact of the media on students' achievement in Sequences and Series has not yet been empirically tested. Future studies are recommended to involve a larger sample

size and to conduct experimental or quasi-experimental research designs to evaluate the effectiveness of the developed media on students' conceptual understanding and learning performance.

IV. CONCLUSION

Based on the results of the study, it can be concluded that the Canva-based interactive learning media for the topic of Sequences and Series is highly feasible and practical for use in senior high school mathematics learning. The validation and practicality assessments conducted by media experts, material experts, and students yielded high average scores, indicating that the media meets quality standards in terms of design, content, and usability.

The most prominent aspects of the media are the construct, which refers to the logical sequence and organization of the content, and its visual attractiveness. These aspects make the media easy to use, engaging, and effective in increasing students' motivation and participation in the learning process. In addition, the media supports technology-integrated learning and is in line with the principles of the Merdeka Belajar curriculum.

Despite these positive findings, this study has a limitation in that it has not yet reached the effectiveness stage. As a result, the impact of the Canva-based interactive learning media on improving students' learning outcomes has not been empirically examined. Therefore, future research is recommended to conduct effectiveness testing and continue the study to the dissemination stage in order to

strengthen the evidence of the media's instructional effectiveness.

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