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Developing Interactive Learning Media through Canva Website and Quizizz Mastery Peak Integration to Enhance Problem-Solving Skills

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ABSTRACT

This study addresses the low motivation and limited problem-solving ability of students in mathematics, as well as the insufficient use of interactive digital learning media in schools. Preliminary observations of grade X students at SMA Negeri 2 Batang indicated low enthusiasm toward conventional mathematics instruction with minimal interactivity. To overcome this challenge, innovative media were developed using Canva Website integrated with the Quizizz Mastery Peak platform through a gamification approach. The development process employed the ADDIE model, which consists of five systematic stages: analysis, design, development, implementation, and evaluation. Data were collected through observations, interviews, needs questionnaires, expert validation, and student responses. Eight experts, including lecturers and mathematics teachers, validated the media, while practicality testing involved 27 grade X.2 students. The results indicated that the media met the criteria of validity and was rated as highly practical by students. Integration of Canva Website and Quizizz Mastery Peak has the potential to foster student engagement, interactivity, and active participation in mathematics learning. Nevertheless, further experimental or quasi-experimental research is required to rigorously evaluate its effectiveness in significantly improving mathematical problem-solving skills.

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Introduction

At present, rapid advancements in science and technology continue to generate innovations driven by human creativity. Technology-based learning has emerged as an innovation and valuable learning resource, making the learning process more engaging and enjoyable through the use of digital devices such as computers and smartphones (Ananda Yulian et al., 2023). Education, as the foundation for developing high-quality human resources,

requires not only the cognitive delivery of knowledge but also varied, interactive, and enjoyable approaches to instruction (Nurfadillah et al., 2021). Teachers are therefore expected to utilize instructional tools, media, teaching aids, and learning resources in a balanced, engaging, and meaningful way that aligns with the competencies demanded in the 21st century (Lakoy, 2022). Mathematics is one of the core subjects that plays a pivotal role in developing logical reasoning and problem-solving skills (Amalia & Hadi, 2021). Its primary goal is to prepare students to plan, reason, and formulate solutions to real-life problems (Yuliawan et al., 2024). However, as noted by Sinaga et al. (2024), while students can often follow the content during lessons, they frequently struggle to solve problems or answer extended questions. A major challenge in mathematics learning is the lack of motivation and interest among students, often caused by monotonous teaching methods and unappealing materials (Juhaeni et al., 2023; Miftahul Jannah et al., 2023).

A lack of motivation undermines students' mathematical problem-solving skills, a competency central to 21st-century mathematics education. Research has demonstrated that integrating technology into learning can create more engaging and challenging experiences while promoting deeper understanding. For example, interactive media have been shown to increase students' engagement and participation (Sarah, 2024), while innovative digital media improve learning interest and conceptual understanding in mathematics (Hafizah & Samosir, 2023). Varied instructional media also enable students to communicate their ideas more effectively. Non-monotonous and flexible media make the learning process more enjoyable, thereby enhancing mathematical reasoning and students' ability to find solutions (Sinaga et al., 2024). In practice, however, mathematics learning in schools still relies heavily on textbooks as the primary source of knowledge, with limited integration of digital media. To optimize the use of digital platforms as interactive learning tools, innovation is needed that aligns with students' characteristics and learning environments, ultimately enhancing their understanding and problem-solving skills.

This gap highlights the urgency of developing digital, interactive learning media tailored to current student needs. Such media should not only present content in a visually appealing format but also provide meaningful challenges, immediate feedback, and enjoyable learning experiences that foster problem-solving skills. Instructional media should adapt to students' learning styles, help transform abstract concepts into concrete forms, and increase motivation and engagement (Lestaria Ningsih et al., 2024). In this context, Canva Website serves as a platform for visually appealing content delivery (Sobandi et al., 2023), while Quizizz Mastery Peak offers gamified evaluation with real-time progress tracking (Official Website Quizizz, 2024). Together, these platforms present a synergistic potential that has not yet been widely explored in mathematics learning. The novelty of this study lies in integrating Canva and Quizizz Mastery Peak into a unified interactive learning ecosystem through gamification. Incorporating game elements such as points, levels, and competition has been proven to enhance student motivation and learning outcomes (Syuhada et al., 2023; Dzikroh, 2025). This integration is expected to create a learning environment that is engaging, competitive, and enjoyable, thereby strengthening students' logical thinking and mathematical problem-solving abilities.

Observations conducted at SMA Negeri 2 Batang revealed that students' low motivation in mathematics stemmed from difficulties in understanding the material presented by teachers. Students were often unmotivated to strive for higher achievement because lessons lacked challenges that encouraged success in evaluation tasks. This lack of motivation weakened their problem-solving abilities, resulting in suboptimal learning outcomes. Conventional practices, such as copying problems from the board and solving them on paper, fostered boredom and reduced enthusiasm for exercises or evaluations. Consequently, students had little drive to

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achieve their best performance. Addressing these challenges, this study seeks to develop interactive learning media based on Canva Website integrated with Quizizz Mastery Peak through a gamification approach to enhance students' mathematical problem-solving skills. The proposed media are expected to serve as an innovative, interactive, and effective solution to strengthen mathematical problem-solving skills in the learning process.

Method

Type of Research

This study is a Research and Development (R&D) project aimed at producing an interactive web-based learning media, namely Canva Website integrated with Quizizz Mastery Peak. The product is designed to foster students' mathematical problem-solving skills and will be validated for both effectiveness and practicality to ensure its feasibility in classroom use. The development process employed the ADDIE model (Analyze, Design, Development, Implementation, Evaluation) as developed by Branch (Batubara, 2022). This model was selected for its systematic and structured framework, emphasizing effectiveness and efficiency throughout the development process (Miftahul Jannah et al., 2023). In addition, ADDIE highlights the importance of dynamic interactions among students, teachers, and the learning environment (Hidayat & Nizar, 2021). Fina Fitriya & Faizah (2021) describe ADDIE as a systematic instructional design model, organized in a programmed manner with sequential stages, making it suitable for addressing instructional challenges related to learning resources while accommodating students' needs and characteristics.

Subjects

Subjects of this study were 27 grade X.2 students in the 2024/2025 academic year at SMA Negeri 2 Batang, consisting of 11 male and 16 female students. The selection of subjects was aligned with the material and product developed by the researcher and based on recommendations from the mathematics teacher.

Instruments and Data Collection

Initial data collection involved observations and interviews to identify problems forming the foundation of this study. The interviews were conducted directly with the mathematics teacher and students. In addition, questionnaires were administered to measure the validity and practicality of the developed interactive learning media. Three types of questionnaires were used in this study. The needs analysis questionnaire was employed to gather preliminary data related to the mathematics content to be developed and to identify the needs of both students and teachers in overcoming difficulties during the learning process. The product validation questionnaire was designed to determine the feasibility of the product and ensure that the developed media is valid and suitable for classroom use. Meanwhile, the student response questionnaire was used to evaluate the practicality of the product and to capture students' perceptions of learning with the developed media. The items of the product validation and student response questionnaires were aligned with indicators of students' mathematical problem-solving skills, as presented in Table 1.

Table 1. Assessment Indicators and Items

Assessment Indicators	Assessment Items	Assessment Indicators	Assessment Items

Content – Aspect of Content Feasibility	Completeness of material	Aspect of Presentation	Logical sequence of concepts
	Breadth of material		Appropriateness of illustrations in the discussion
	Depth of material		Appropriateness of practice exercises at the end
	Accuracy of concepts		Appropriateness of answer keys
	Accuracy of examples		Introduction
	Accuracy of illustrations		Student involvement in learning
	Supports understanding of problems	Media – Aspect of Accessibility	Ease of use in operation
	Supports planning problem-solving strategies		Media compatibility across devices
	Supports solving problems according to the plan		Clarity of instructional guidelines
	Supports reviewing and checking problem-solving results		Functionality of buttons
Aspect of Graphic Feasibility	Appropriateness of display size with mobile devices	Aspect of Language Feasibility	Ability to motivate students
	Clear and neat layout elements		Clarity of information comprehension
	Attractiveness of features used		Conformity of grammar with Standard Indonesian Grammar (TBBBI)
	Clarity and neatness of images and text		Conformity of spelling with Indonesian Spelling Guidelines (PUEBI)
	Readability of fonts		
	Limited use of multiple font combinations		
	Consistency of image layout based on learning sequence		
	Alignment of media with taught material		
	Readability of media typography		
	Interaction between media and users		

Table 2. Student Response Questionnaire

No.	Assessment Items
	Ease of Use
1.	The content presented in this media is easy for me to understand.
2.	This media helps me master the material more easily.
3.	I can use this media for independent learning.
	Usefulness
1.	This media helps me practice mathematical problem-solving skills and apply them in real life.
2.	This media helps me connect the material learned with problems in everyday life.
3.	This media broadens my knowledge.
	Time Flexibility
1.	I can use this media anytime and anywhere.
	Attractiveness
1.	The design of this media is visually appealing.
2.	This media keeps me from feeling bored during learning.
3.	The contexts presented in this media are packaged in an engaging way based on real-life problems.
4.	The material presented in this media can be read clearly.

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Analysis

Product Validation Analysis

Validation data were obtained from assessments conducted by validators in collaboration with the researcher. The first step was converting qualitative data from the product validation questionnaire into quantitative form using a Likert scale (Table 3).

Table 3. Product Validation Rating Scale

No.	Classification	Score
1	Excellent (SB)	5
2	Good (B)	4
3	Fair (C)	3
4	Poor (K)	2
5	Very Poor (SK)	1

The percentage was calculated using the mean formula:

$$P = \frac{\Sigma V_a}{n}$$

where P = average percentage per instrument, V_a = score percentage of each validator/respondent, and n = number of validators/experts. The results were then converted into percentages and interpreted according to the criteria of Delfita et al. (2020) (Table 4). A product was considered valid if it met the "Valid" category or higher; otherwise, revisions were required based on validators' feedback.

Table 4. Validity Criteria Percentage

No.	Achievement Level (%)	Category
1	85.01% < V ≤ 100%	Very Valid
2	70.01% < V ≤ 85.00%	Valid
3	50.01% < V ≤ 70.00%	Less Valid
4	01.00% < V ≤ 50.00%	Not Valid

Student Response Analysis

Practicality data were obtained from student responses to the developed product. As with validation, qualitative data from the student response questionnaire were converted into quantitative form using a Likert scale (Table 5).

Table 5. Student Response Rating Scale

No.	Classification	Score
1	Excellent (SB)	5
2	Good (B)	4
3	Fair (C)	3
4	Poor (K)	2
5	Very Poor (SK)	1

The percentage was calculated using the same mean formula:

$$P = \frac{\Sigma V_a}{n}$$

where P = average percentage per instrument, V_a = score percentage of each respondent, and n = number of respondents. The results were then interpreted based on the practicality

criteria of Delfita et al. (2020) (Table 6). A product was considered practical if it reached the "Practical" category or higher; otherwise, revisions were made in line with student feedback.

Table 6. Practicality Criteria Percentage

No.	Achievement Level (%)	Category
1	$85{,}01\% < P \leq 100\%$	Very Practical
2	$70{,}01\% < P \leq 85{,}00\%$	Practical
3	$50{,}01\% < P \leq 70{,}00\%$	Less Practical
4	$01{,}00\% < P \leq 50{,}00\%$	Not Practical

Results

Based on the ADDIE development model, the steps in developing the interactive learning media using Canva Website integrated with Quizizz Mastery Peak are as follows:

Analysis

The first stage was the analysis. The study began with an initial observation at SMA Negeri 2 Batang to examine the school curriculum and the learning process in place. A needs analysis revealed that some students' mathematics learning outcomes had not met the minimum mastery criteria due to difficulties in learning from the provided textbooks. Moreover, the learning process had not yet integrated digital learning media; instead, it was conducted conventionally, with teachers writing material on the blackboard and students copying it into their notebooks. This condition indicated the need for innovation in the form of interactive learning media to foster students' mathematical problem-solving skills. Therefore, the researcher developed interactive learning media using Canva Website integrated with Quizizz Mastery Peak through a gamification approach to enhance students' mathematical problem-solving abilities.

Design

The second stage was product design, during which the specifications and overall framework were determined. The developed product was outlined in three sections, as shown in Table 7.

Table 7. Product Specifications

Section	Components
Beginning	• User Guide Page • Title Cover Page • Menu Page
Content	• Learning Objectives Page • Material Page • Example Exercises Page • Evaluation Page
End	• Quizzes completed by students via Quizizz Mastery Peak • Learning Reflection

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Overall content of the interactive learning media using Canva Website integrated with Quizizz Mastery Peak consisted of statistical materials and practice exercises for grade X students at SMA Negeri 2 Batang, as summarized in Table 8.

Table 8. Content Outline of the Interactive Learning Media

Outline	Content
Statistics Material	Definition of statistics
	Forms of data presentation from real-life problems in various diagrams
	Measures of central tendency
	Measures of position
	Measures of data dispersion
Example Exercises	Hyperlinks accessible in both mobile and desktop modes
	Contextualized problems based on real-life statistical applications
	Explanations aligned with indicators of students' mathematical problem-solving skills
Evaluation	Quizizz website with Mastery Peak mode to train students' mathematical problem-solving skills
Reflection	Learning reflection linked to an online form

The researcher also collected references from relevant books and online sources to be included in the material. Research instruments and product evaluation tools were then prepared, consisting of a product validation questionnaire for experts and a student response questionnaire. Both instruments used a checklist format with a five-point Likert scale: 5 (excellent), 4 (good), 3 (fair), 2 (poor), and 1 (very poor). After development, the instruments were validated by experts, who confirmed their relevance and feasibility without the need for revision.

Development

At this stage, several processes were carried out, beginning with product development. The researcher developed the media based on the predetermined flowchart and storyboard, using relevant references such as books and websites as content sources for the interactive learning media developed with Canva Website integrated with Quizizz Mastery Peak through a gamification approach. Cover page contains the title of the material presented in this interactive learning media along with the label "Grade X Senior High School," as the media is intended for this level. Additional design elements were included to attract users' attention, as shown in Figure 1.

Figure 1. Cover Page Display

Menu page features hyperlink buttons to make navigation easier for users. It includes the tagline *"Let's Make Learning Fun"* as well as buttons for learning objectives, material, example exercises, evaluation, author profile, and feedback, as shown in Figure 2.

Figure 2. Menu Page Display

This page outlines the learning objectives to be achieved when students use the Canva Website–Quizizz Mastery Peak interactive learning media with a gamification approach, as displayed in Figure 3.

Figure 3. Learning Objectives Page Display

This page contains statistical content adapted from various references, including books and online sources. The material covers the definition of statistics, data presentation, measures of central tendency, measures of position, and measures of dispersion, as shown in Figure 4.

Figure 4. Material Page Display

Example Exercises page provides two hyperlink buttons, allowing users to access practice problems in both mobile and desktop modes, as illustrated in Figure 5.

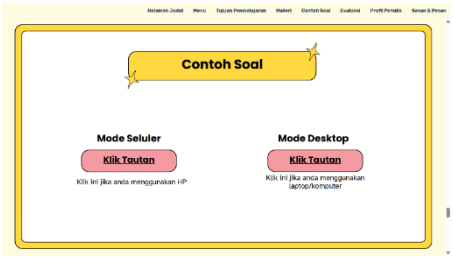

Figure 5. Example Exercises Page Display

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Evaluation page includes a hyperlink connected directly to Quizizz in Mastery Peak mode, enabling students to begin quizzes, as shown in Figure 6.

Figure 6. Evaluation Page Display

Author Profile Page provides the author's name, university, and study program as background information, as presented in Figure 7.

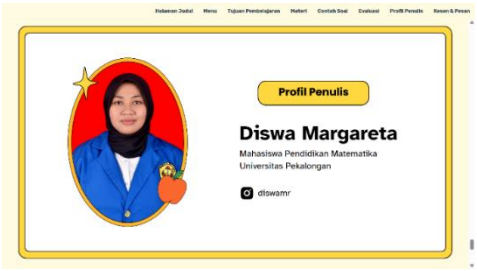

Figure 7. Author Profile Page Display

On the feedback page, students can submit reflections after using the interactive learning media developed with Canva Website integrated with Quizizz Mastery Peak, as shown in Figure 8.

Figure 8. Feedback Page Display

Following development, the interactive learning media was validated by a panel of three mathematics education lecturers and five mathematics teachers. The validators assessed the media using a Likert-scale instrument and provided comments and suggestions for revision. These inputs served as the basis for initial product revisions to ensure its feasibility for student trials. The initial revisions made according to the validators' feedback are summarized in Table 9.

Table 9. Suggestions from Validators and Revisions

Suggestions	Revisions
Add a user guide page	 **Figure 1**. Before Revision  **Figure 2.** After Revision

Add an introduction to the learning objectives

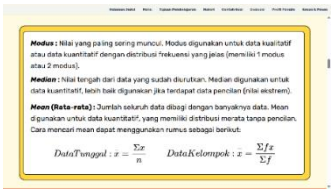

Figure 3. Before Revision

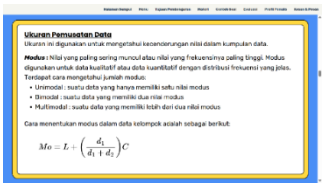

Figure 4. After Revision

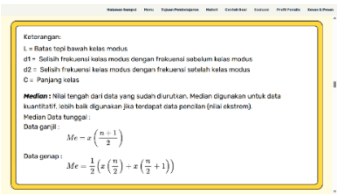

Figure 5. After Revision

Add types of mode and the formula for calculating the mode of grouped data

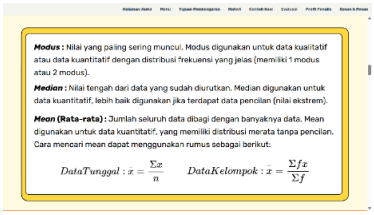

Figure 6. Before Revision

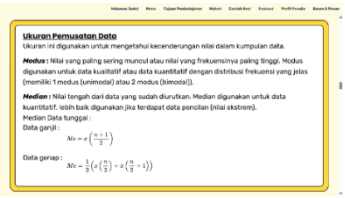

Figure 7. After Revision

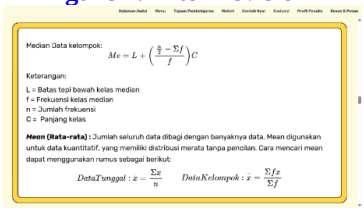

Figure 8. After Revision

Add the method for calculating the median of odd and even data, as well as the formula for calculating the median of grouped data

Figure 9. Before Revision

Figure 10. After Revision

After the revisions were made, the validation results from the experts were calculated. The interactive learning media developed with Canva Website integrated with Quizizz Mastery Peak was evaluated, and the results are shown in Table 10.

Table 10. Product Evaluation Results by Validators

No.	Assessment Aspect	Score Percentage	Classification
1	Content Feasibility	83.50%	Valid
2	Presentation Feasibility	86.25%	Very Valid
3	Language Feasibility	88.75%	Very Valid
4	Media Accessibility	89.38%	Very Valid
5	Graphic Feasibility	85.75%	Very Valid
	Conclusion	**86.09%**	**Very Valid**

Evaluation of the Canva Website–Quizizz Mastery Peak interactive learning media showed that the content feasibility aspect scored 83.50% (valid), presentation feasibility 86.25% (very valid), language feasibility 88.75% (very valid), media accessibility 89.38% (very valid), and graphic feasibility 85.75% (very valid). Based on these results, the average

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score reached 86.09%, which falls into the "very valid" category. Therefore, it can be concluded that the developed interactive learning media meets the validity criteria and is feasible for classroom trials.

Implementation

Fourth stage was the implementation of the developed product in the learning process. The product trial was conducted with 27 students from grade X.2 at SMA Negeri 2 Batang. The product was accessed through the website *masterypeak.my.canva.site* using the students' personal mobile devices. In addition, the researcher distributed student response questionnaires to all 27 students after the learning session using the interactive learning media developed with Canva Website integrated with Quizizz Mastery Peak. The student response questionnaire was used to assess the practicality of the product. The results indicated that no suggestions for a second revision were provided by the students. Therefore, it can be concluded that the product is feasible for use without further revision.

Evaluation

In the fifth stage, evaluation, the researcher limited the study to a second revision of the product if suggestions were provided after the student trial. Based on the trial results, students did not provide any comments on the developed product. Therefore, it was concluded that the product was feasible for use without further revision. The researcher then compiled the results of student responses to the developed product, as presented in Table 11.

Table 11. Results of Student Response Assessment of the Product

No.	Assessment Aspect	Score Percentage	Classification
1	Ease of Use	83.70%	Practical
2	Usefulness	82.22%	Practical
3	Time Flexibility	84.44%	Practical
4	Attractiveness	86.30%	Very Practical
	Conclusion	**84.31%**	**Practical**

Student response assessment indicated that the ease-of-use aspect scored 83.70% (practical), the usefulness aspect 82.22% (practical), the time flexibility aspect 84.44% (practical), and the attractiveness aspect 86.30% (very practical). Overall, the interactive learning media developed with Canva Website integrated with Quizizz Mastery Peak achieved an average score of 84.31%, which falls into the "practical" category. Thus, the media can be considered practical. In addition, the summative assessment results on Quizizz Mastery Peak showed that students achieved an average score of 95.93%, demonstrating that the use of this interactive learning media can foster students' mathematical problem-solving skills.

Discusion

Interactive learning media combine digital elements such as text, images, audio, video, and animation designed to foster reciprocal interaction between students and learning materials, thereby encouraging active engagement in the learning process (Mulyono et al., 2025). According to Heinich in Juhaeni et al. (2023), the primary purpose of instructional media is to deliver information effectively through multiple channels of representation so that learning messages can be optimally received by students. The use of interactive learning media enables teachers to express creativity and innovation in developing engaging teaching materials, which

in turn enhances students' interest and participation in learning (Okta Nadia & Desyandri, 2022). One practical approach teachers can take in designing such media is through the use of digital platforms such as Canva and Quizizz. Canva provides a variety of visual features, including graphic design, animations, and interactive elements, which enrich the presentation of instructional materials to make them more attractive and comprehensible for students. Meanwhile, Quizizz Mastery Peak functions as a gamified assessment tool that allows teachers to create interactive quizzes and track students' progress in real time. Together, these platforms not only support effective delivery and assessment of learning but also foster enjoyable and competitive learning experiences (Kharissidqi & Firmansyah, 2022; Aditiyawarman et al., 2022).

Integration of Canva Website and Quizizz Mastery Peak into an interactive, gamified learning medium proved effective in facilitating more engaging and meaningful mathematics instruction. Based on validation results from eight experts, the media were rated highly valid, while trial results indicated that the product was also highly practical for student use. Its appealing visual design and intuitive navigation allowed students to operate the media independently, making it a useful supplementary learning resource outside the classroom. This finding aligns with Priyanto et al. (2024), who reported that interactive media can increase student engagement and participation in learning, ultimately yielding positive impacts on learning outcomes and mathematical problem-solving skills.

This study also reinforces the findings of Wati et al. (2025), who developed mathematics learning media based on animation using Canva. Their study reported that the developed media achieved valid (score 0.87), highly practical (score 0.93), and highly effective (score 0.85) categories. These results demonstrate that Canva has strong potential as a platform for delivering mathematics content in 21st-century learning. The innovation in the present study goes a step further by integrating Canva and Quizizz Mastery Peak into a unified web-based system that not only presents content but also incorporates evaluation through a gamified approach.

Thus, the results of this study contribute to the development of digital, interactive learning media models that can be practically implemented in schools. The integration of these two popular platforms also offers an alternative solution to address students' low motivation and limited problem-solving skills often observed in conventional mathematics instruction. Nevertheless, to gain a more comprehensive understanding of the effectiveness of this media in significantly improving learning outcomes, further research is needed using experimental or quasi-experimental designs.

Conclusion

This study found that interactive learning media developed using Canva Website integrated with Quizizz Mastery Peak through a gamification approach met the criteria of validity and practicality, with potential to enhance students' mathematical problem-solving skills. Expert validation indicated that the media was categorized as very valid, while student responses classified it as practical. Thus, the developed media is considered feasible as an alternative for engaging and challenging mathematics instruction, particularly in grade X statistics. It not only supports visually appealing content delivery through Canva but also enables enjoyable and adaptive assessment via Quizizz Mastery Peak. This study is limited to statistics content. Future research should extend the development of similar media to other mathematics topics and employ experimental or quasi-experimental designs to examine its broader effectiveness in improving learning outcomes and fostering students' critical thinking skills.

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Conflict of Interest

The authors declare that there is no conflict of interest.

Authors' Contributions

D.M. was fully responsible for instrumentation, design, conceptualization, data collection, data processing, data analysis, presentation of results and discussion, revision, and adjustment of all information in this article. Meanwhile, S.K. contributed to the development of the theoretical framework and approved the final version of the manuscript. The authors' contributions to the conceptualization, preparation, and revision of this article are as follows: D.M.: 60% and S.K.: 40%

Data Availability Statement

The authors declare that the data supporting the findings of this study will be made available by the corresponding author, [D.M.], upon reasonable request.

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