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User Interface (UI) and User Experience (UX) Design Using Figma Application as a Physics Learning Medium for Energy Topics in Grade VIII at SMP Negeri Samarinda

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Abstract

This study aims to design and develop a physics learning medium on the topic of energy for eighth-grade students based on User Interface (UI) and User Experience (UX) principles using Figma, and to evaluate its feasibility in supporting learning. The research employed a Research and Development (R&D) method with a design thinking approach. The participants were 53 eighth-grade students from a public junior high school in Samarinda. Data were collected through questionnaires based on validation results from subject matter experts, media experts, a subject teacher, and student responses. The validation results indicate that the developed media is highly feasible in terms of visual design, content quality, usability, and instructional usefulness. In addition, students showed high levels of interest and learning motivation. Therefore, the UI/UX-based learning media developed using Figma is considered effective in enhancing students' understanding of energy concepts while providing an interactive and engaging learning experience.

Keywords: Design Thinking, Development Using UI/UX Design, Energy, Figma Application, Learning Media

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INTRODUCTION

Fundamentally, the integration of technology, information, and communication in learning media has significantly advanced in recent years. Technological interactions have become easier and more diverse. These developments have impacted various fields, including economics, healthcare, religion, and education. Education is a process of developing students' potential and resources to prepare them to face the challenges of a rapidly evolving era. In the current era of information technology, high-quality UI/UX design is crucial for creating well-designed information systems (Muslimin & Zuraidah, 2023). Learning media is defined as any tool that can be used to convey messages from senders to receivers, thereby stimulating students' thoughts, feelings, attention, and interest in learning (Tafonao, 2018). According to Amka (2018), learning media can be understood as physical or non-physical tools used as intermediaries between teachers and students to understand materials more effectively and efficiently, allowing information to be rapidly and fully received by students while attracting their interest to learn further. Generally, the benefit of media in the learning process is to facilitate interaction between teachers and students so that learning becomes more effective and efficient (Setipu, 2021). The application of this media is a solution to challenges in the learning process, where appropriate media adapted to student characteristics can serve as a tool to capture student attention, improve the learning

process, and ultimately increase students' understanding of the instructional material (Mustaqim, 2016)

The use of interactive learning methods has become increasingly popular to promote active learning and achieve optimal learning outcomes (e.g., Noviyanto et al., 2015; Setipu, 2021). A key advancement among educational application developers is the creation of multimedia-based interactive learning applications. These applications offer various interactive features that engage students. To address conventional learning limitations, a solution is needed that leverages technological advancements through mobile applications. Mobile applications allow users to perform various activities, such as communicating, working, and shopping quickly and easily through handheld devices (Nasikh & Zuhdu, 2023).

There are various methods to produce intuitive UI/UX designs that provide an enjoyable user experience, including the design thinking method. The design thinking method is commonly used in research because each phase places the user at the center of thought, ensuring that solutions obtained match user needs and address user problems. Design thinking is highly effective for solving complex, ill-defined, or unknown problems by understanding the needs and desires of the parties involved, reframing the problem with a user-centric approach, generating various solution ideas through brainstorming sessions, and making decisions (Gulo et al., 2023).

User Interface (UI) refers to the visual appearance that connects users with digital products and has existed since 1973, known as the Graphical User Interface (GUI) (Prasetiyo et al., 2022). User Interface is an important aspect that increases website traffic or application downloads and is one of the key factors determining visitors' interest in exploring a website (Khasanah & Sutabri, 2023). User Interface design needs to have an aesthetic that follows the latest visual trends so that users feel comfortable, easily understand navigation, and are encouraged to continue using mobile applications sustainably (Hartadi et al., 2020).

User Experience (UX) refers to the experience provided by a website or application to its users, ensuring that the resulting interaction is engaging and interactive (Himawan & Yanu, 2020). Designing a good User Experience can enhance user satisfaction and create a positive dependence that encourages them to continue using the product. User Experience is a critical element in developing quality products, systems, and services, especially on online platforms where many users rely on digital services in their daily lives (Yusof et al., 2022). User Experience is influenced by user conditions such as expectations, needs, and motivation, as well as system characteristics like complexity, usability, functionality, and the interaction environment (Jeon, 2021).

In the context of educational product design, the ADDIE (Analysis, Design, Development, Implementation, Evaluation) framework serves as a structured development model to design and develop effective instructional products. Specifically, the process of physics learning involves active steps such as identifying and formulating problems, formulating hypotheses, designing experiments, conducting observations, recording experimental data, testing hypotheses, and drawing conclusions (Susanti et al., 2016). Physics education goes beyond memorizing formulas; it requires active inquiry where students are expected to think creatively, adopt a scientific attitude, and develop the ability to use scientific methods (Yuliska et al., 2020).

According to Wibowo and Setiaji (2020), design thinking is a method used to solve problems and provide efficient solutions to prospective users so that the resulting product aligns with their needs and desires. Sari and Setiawan (2022) state that design thinking is a process to resolve problems by taking a user-centered approach; through this approach, ideas and concepts are generated to yield solutions to the problems and implemented in the interface design of the application to be built. Design thinking is extremely useful in efforts to address complex problems by understanding the human needs involved, reframing the problem in a human-centric way, creating numerous ideas in brainstorming sessions, and adopting a hands-on approach in prototyping and testing (Telaumbanua, 2019).

Several previous studies have explored the development of digital learning media for physics in secondary schools. For instance, Puspitasari et al. (2021) developed physics instructional materials using a STEM-based approach, while Noviyanto et al. (2015) utilized animation media to enhance conceptual understanding. Furthermore, general digital platforms have been proposed for school use

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(e.g., Setipu, 2021). However, most existing applications rely on conventional static interfaces or pre-packaged mobile formats that lack user-centered refinement. There is a distinct lack of research that applies the design thinking methodology specifically to optimize User Interface (UI) and User Experience (UX) designs for teaching energy concepts to eighth-grade students. This research addresses this gap by developing a high-fidelity Figma prototype that prioritizes interactive layouts and visual clarity, ensuring that the media aligns with the cognitive characteristics of junior high school students.

METHODS

The research method used in this study is Research and Development (R&D) based on the design thinking approach. Rachman et al. (2024) explained that R&D research is a systematic approach to generate new knowledge, solve problems, or develop products, processes, or services. The R&D process involves several structured steps, beginning with identifying problems or opportunities, planning the research, collecting data, analyzing results, and developing new solutions or products. Based on this explanation, this study uses the design thinking method to execute the steps of designing and developing UI/UX-based learning media. The research was conducted in September 2025 at SMP Negeri 6 Samarinda, located at Jalan Jenderal Urip Sumohardjo No.153, Samarinda Ilir District, Samarinda City, East Kalimantan. The subject of this study is the learning media based on User Interface (UI) and User Experience (UX) principles. The objects of this study are eighth-grade students from classes VIII-F and VIII-G, with a total of 53 students. The sampling technique used was purposive sampling. The researcher selected this sample based on the criteria that these classes possessed nearly identical academic abilities and were currently studying the topic of Energy. This study utilized questionnaires for data collection, consisting of validation sheets from media experts, material experts, and subject teachers, as well as student response questionnaires. This study was limited to the third stage of the ADDIE model, which is development.

Validation was carried out to evaluate and determine the feasibility of the created learning media. Subsequently, this validation process was conducted by several experts, including material experts, media experts, and teachers. The validation sheet for material experts was given to individuals capable of analyzing the content used in the learning media. The validation sheet for media experts was given to individuals capable of analyzing the learning media's technical design. The teacher validation sheet was provided to the general science subject teacher.

The material expert validation questionnaire was adapted from Sugihartini and Yudiana (2018), which was further customized based on the analysis of learning needs in schools to evaluate material accuracy, language, presentation, and evaluation aspects.

Table 1. Specification grid for material expert questionnaire

No	Aspect	Indicators	Item Number
1.	Material Accuracy Aspect	Alignment with learning achievements and objectives	1
		Correctness of material content	2
		Appropriateness of material context	3
		Ease of understanding the instructional material	4
2.	Language Aspect	Suitability of language elements with student characteristics	5
		Clarity and straightforwardness of language	6
3.	Presentation Aspect	Engaging presentation of learning content	7
		Quality of object presentation	8
4.	Evaluation Aspect	Alignment of quiz questions with instructional material	9
		Quality of questions in the learning media	10

In the material expert validation questionnaire, several aspects are evaluated: the material accuracy aspect, which includes alignment with learning achievements and objectives, correctness of content,

appropriateness of material context, and ease of understanding. Additionally, the language aspect covers the suitability of linguistic elements with student characteristics and language straightforwardness. Furthermore, the presentation aspect includes whether the learning content is attractively presented and the quality of object presentation. Lastly, the evaluation aspect covers the alignment of quiz questions with the taught material and the quality of questions within the learning media.

Table 2. Specification grid for media expert questionnaire

No	Aspect	Indicators	Item Number
1.	Media Interface Design Aspect	Consistency of layout across components of the learning media	1
		Appropriateness of material content visualization	2
		Suitability of color choices and font sizes	3
		Clarity of images	4
		Functional clarity of menu buttons and navigation accessibility	5
		Clarity of media instructions/user guide	6
2.	Software Engineering Aspect	Smoothness and ease of operating the learning media	7
		Absence of operational constraints in the media	8
3.	Usefulness Aspect	Benefits of the learning media in the school teaching process	9
		Benefits of the learning media for both students and teachers	10

The media expert validation questionnaire evaluated three main aspects: interface design, software engineering, and usefulness. The interface design aspect covered layout consistency, appropriateness of material visualizations, suitability of colors and font sizes, image clarity, functionality of buttons and navigation, and clarity of instructions. The software engineering aspect focused on the smoothness and ease of operating the learning medium, including potential technical or operational constraints. Meanwhile, the usefulness aspect assessed the relevance and benefits of the learning medium in supporting teaching and learning activities at school, particularly its applicability for both students and teachers.

Table 3. Specification grid for subject teacher questionnaire

No	Aspect	Indicators	Item Number
1.	Media Outcome Aspect	Visual design of the learning media	1
		Suitability of the instructional material	2
		Clarity of images	3
		Fostering enthusiasm and curiosity toward the material via the media	4
		Alignment of quiz questions with content	5
2.	Usability Aspect	Ease of using the media	6
		Ease of understanding the instructional material	7
		Assisting students in visualizing the taught energy concepts	8
		Assisting and easing teachers in delivering material	9
		Absence of constraints during usage at school	10

The subject teacher validation questionnaire assessed two main aspects: media quality and usability. The media quality aspect included visual interface design, suitability of the learning materials, image clarity, the ability to stimulate students' enthusiasm and curiosity, and alignment of quiz content

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with the learning objectives. Meanwhile, the usability aspect evaluated ease of use, ease of understanding the materials, support for visualizing energy concepts, assistance in facilitating teachers' instructional activities, and potential constraints encountered when using the learning medium at school.

Table 4. Specification grid for student response questionnaire

No	Aspect	Indicators	Item Number
1.	Media Outcome Aspect	Visual design displays attractive illustrations	1
		Suitability and depth of the material content	2
		Clarity of images	3
		Fostering learning enthusiasm and curiosity toward the material	4
		Appropriateness of language in the learning media	5
		Alignment of quiz questions with the material	6
2.	Usability Aspect	Ease of operating the learning media	7
		Ease of understanding the instructional material	8
		Assisting students in visualizing the taught energy concepts	9
		Absence of constraints during usage at school	10

The student response questionnaire assessed two main aspects: media quality and usability. The media quality aspect included the attractiveness of illustrations, depth and relevance of the learning materials, image clarity, ability to stimulate students' enthusiasm and curiosity, appropriateness of language, and alignment of quiz content with the learning materials. Meanwhile, the usability aspect evaluated ease of operation, ease of understanding the materials, the effectiveness of visualizations in illustrating energy concepts, and potential constraints in using the learning medium at school.

Table 5. Likert scale for validation and student response

Assessment	Description	Score
SS	Strongly Agree	5
S	Agree	4
K	Fair / Undecided	3
TS	Disagree	2
STS	Strongly Disagree	1

The Likert scale used to assess validation results and student responses was adapted from Sugiyono (2018) and consisted of five response levels: Strongly Agree (SS) with a score of 5, Agree (S) with a score of 4, Fair/Undecided (K) with a score of 3, Disagree (TS) with a score of 2, and Strongly Disagree (STS) with a score of 1. The scores obtained were converted into percentages to determine the validity level and suitability of the UI/UX-based physics learning medium. These percentages were then interpreted using the assessment criteria proposed by Riduwan (2015), as presented in Table 6.

Table 6. Feasibility category classification

Percentage Range	Category
80% < x ≤ 100%	Highly Feasible
60% < x ≤ 80%	Feasible
40% < x ≤ 60%	Moderately Feasible
20% < x ≤ 40%	Less Feasible
x ≤ 20%	Not Feasible

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RESULTS AND DISCUSSION

Results

This study developed a User Interface (UI) and User Experience (UX) design using Figma as a physics learning medium for energy topics for Grade VIII students at SMP Negeri Samarinda. The development process adopted the ADDIE model, which consists of five phases: Analysis, Design, Development, Implementation, and Evaluation. These phases provided a systematic framework for designing the learning medium based on students' needs and learning objectives. The implementation of each phase is described as follows:

Analysis Phase (Analyze)

In this phase, the researcher identified fundamental issues affecting the physics learning process among Grade VIII students. Direct observations were conducted to examine classroom learning activities and the learning resources used at the school. This analysis aimed to identify students' learning needs and the challenges encountered in understanding physics concepts, particularly energy topics. The findings from this phase served as the basis for determining the requirements and developing the proposed UI/UX design. The results of the analysis are presented in Table 7.

Table 7. Identified problems and solutions in the research

No	Identified Problem	Proposed Solution
1.	Learning in school remains conventional.	Using the Figma application design as a physics learning medium for Grade VIII energy topics in SMP Negeri Samarinda can attract students' interest due to its engaging and educational nature.
2.	The lack of learning media besides textbooks is a prominent problem in the school.	Digital-based learning media is introduced to resolve this issue and enhance students' learning motivation.

Product Design Phase (Design)

In the next phase, the researcher designed a storyboard as a preliminary blueprint for the learning medium. The storyboard outlined the structure, content, navigation, and visual elements of each interface page, including the arrangement of learning materials and interactive components. This step helped organize the information systematically and establish a clear flow between different sections of the learning medium. Based on the storyboard, the researcher developed and refined the interface design using Figma, considering visual consistency, readability, ease of navigation, and user interaction. The design was also adjusted to ensure that the presentation of energy concepts was appropriate for Grade VIII students and aligned with the intended learning objectives.

Development Phase (Development)

In this phase, the previously developed conceptual design was realized as a User Interface (UI) and User Experience (UX) design in Figma. Compared to the physics learning media developed in previous studies, which often focused on simple text-heavy slide designs or rigid, non-interactive layouts (e.g., Noviyanto et al., 2015; Puspitasari et al., 2021), this study's media leverages the visual flexibility and high-fidelity capabilities of Figma. It offers interactive micro-animations, structured navigation buttons, and user-friendly layouts specifically tailored to the cognitive engagement needs of middle school students. After development was completed, the product design was validated by experts, including material experts, media experts, and subject teachers, to evaluate the quality of content and presentation, as shown in Figure 1.

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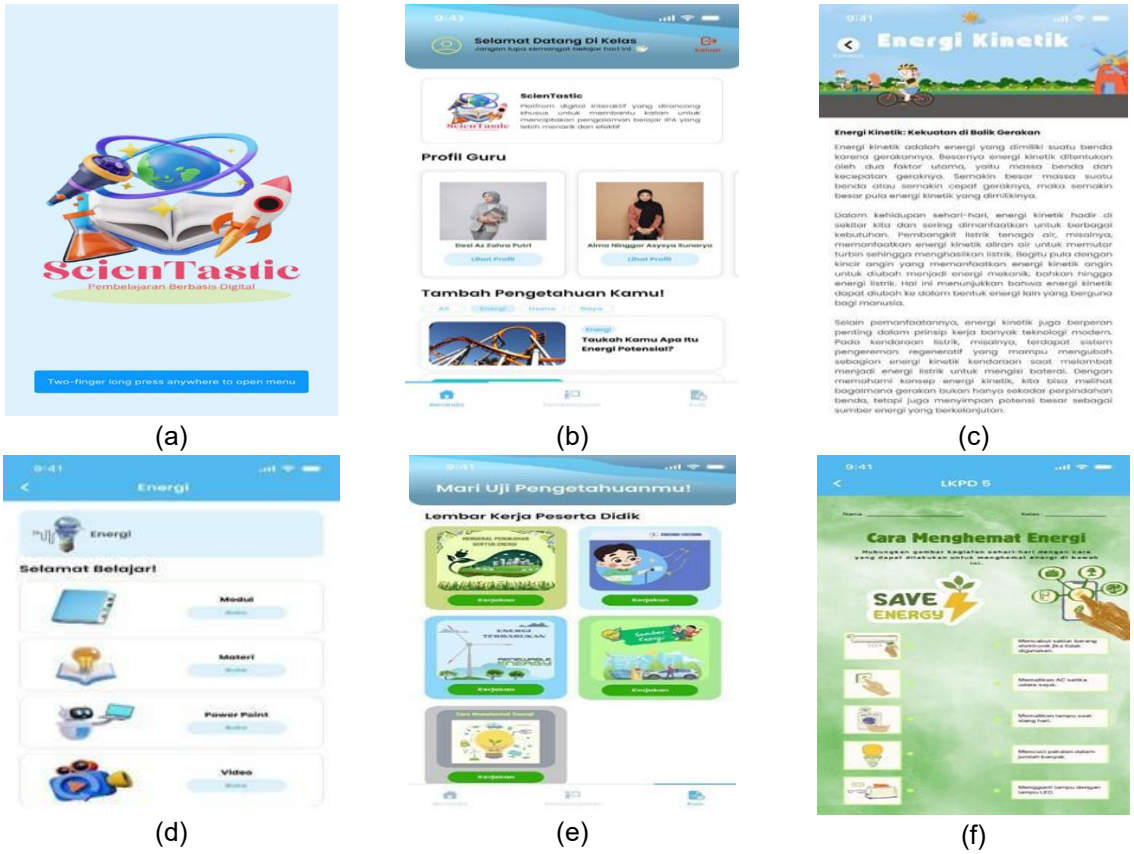


Figure 1. Panels a to f represent: (a) front cover, (b) home interface, (c) kinetic energy expansion view, (d) energy module home menu, (e) student worksheet options, and (f) interactive worksheet layout.

Table 8. Material expert validation results

Expert	Total Score	Percentage	Category
Material Expert	42/50	84.00%	Very Good

The overall percentage obtained from the material expert across all evaluation aspects was 84.00%, falling into the "Excellent" category. Descriptive analysis showed that the obtained score was 42 out of a maximum score of 50.

Table 9. Media expert validation results

Expert	Total Score	Percentage	Category
Media Expert	43/50	86.00%	Very Good

The media validation percentage achieved across all assessment aspects was 86.00%, signifying an "Excellent" category standing. Descriptive analysis revealed a score of 43 out of a maximum score of 50.

Table 10. Subject teacher validation results

Expert	Total Score	Percentage	Category
Subject Teacher	48/50	96.00%	Very Good

The percentage for all evaluated teacher aspects reached 96.00%, falling into the "Excellent" category. Descriptive analysis showed a total score of 48 out of 50. The student response stage was carried out at SMP Negeri 6 Samarinda in class VIII-F (28 students) and class VIII-G (25 students). In

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this step, the researcher introduced the validated learning media to capture student responses. The media link was shared with students for direct testing, along with a user guide manual. Subsequently, students filled out questionnaires individually. The compiled results are displayed in Table 11. The overall student response percentage across all evaluation aspects was 92.11%, falling into the "Excellent" category. Descriptive analysis broke this down into 93.22% for material accuracy and 90.94% for media usability aspects.

Table 11. Student response questionnaire results

Evaluation Aspect	Percentage	Category
Media Outcome	93.22%	Very Good
Usability	90.94%	Very Good
Overall Student Response	92.11%	Very Good

Discussion

This study employed a Research and Development (R&D) method using the ADDIE procedural framework, which consists of five phases: Analyze, Design, Development, Implementation, and Evaluation. However, the research was limited to the Development phase, which included product validation and the evaluation of student responses to determine the feasibility and acceptability of the developed learning media. The analysis phase began with interviews with teachers and students to identify problems that might hinder learning and establish guidelines for subsequent planning (Hidayat & Nizar, 2021). The analysis covered learning needs, physics learning achievements under the Merdeka Curriculum, and relevant literature. Specifically, interviews with physics teachers at SMP Negeri 6 Samarinda explored the teaching of theoretical physics concepts and the availability of digital tools to support the learning process. Furthermore, physics learning achievements in the Merdeka Curriculum comprise two main elements: conceptual understanding of physics and process skills. The literature review also indicated that the development of UI/UX design using Figma as a learning medium for energy topics for eighth-grade students at SMP Negeri Samarinda had not previously been explored, highlighting the research gap addressed by this study.

The design phase focused on planning the learning media by formulating learning objectives and organizing the instructional content into relevant subtopics. The learning materials were structured around conceptual understanding and science process skills, with the theoretical content developed into a digital module using Figma. The module covered work, energy concepts, non-renewable energy, and renewable energy. Subsequently, the Development phase involved producing structured learning media aligned with active learning principles and preparing validation instruments to assess the quality of the product (Sugihartini & Yudiana, 2018). This process resulted in a prototype of Figma-based learning media for energy topics. The prototype then underwent validity testing to determine its feasibility according to academic standards, based on feedback from the validators (Alawiyah et al., 2025). The validation panel consisted of two expert lecturers specializing in material and media and one science teacher from the school. The material validation instrument assessed content accuracy, language, presentation, and evaluation, whereas the media validation instrument examined visual interface design, software engineering, and usefulness. The questionnaires for the teacher and students had similar structures, focusing on the quality of the learning materials and the usability of the developed media.

The validation results indicated that the developed learning media met the expected feasibility criteria. Content feasibility indicators measured the alignment of the learning materials with the Merdeka Curriculum standards (Putri et al., 2023), with material validation achieving an average score of 84.00%. Meanwhile, appropriate and engaging visual displays can contribute to student learning motivation (Afrianti, 2025), and the media validation results reached an average score of 86.00%. The subject teacher's assessment of the Figma-based learning media yielded an average score of 96.00% across

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material and usability aspects. The teacher's feedback indicated that the learning media had a systematic structure and was considered ready for educational use. Student responses showed slight variations, which may have been influenced by differences in digital literacy, emotional state, and attention while completing the questionnaire. Nevertheless, the overall student response score reached 92.11%, categorized as “Excellent.” This positive response suggests that students found the learning materials engaging and that the media could support their conceptual understanding (Puspitasari et al., 2021).

The main advantage of the developed learning media compared with previous designs, such as those reported by Noviyanto et al. (2015) and Puspitasari et al. (2021), lies in its user-centered design approach. Whereas previous media development efforts prioritized content presentation, the Figma-based UI/UX prototype integrates content accuracy with visual design and interactive navigation. The interface was designed to accommodate the cognitive load and learning characteristics of eighth-grade students, with the aim of making abstract energy concepts more accessible. In addition, the prototype provides a validated design framework that can serve as a foundation for further software implementation and support the digitalization of learning at SMP Negeri Samarinda.

CONCLUSION

Based on the research conducted, it can be concluded that the UI/UX design using Figma as a physics learning medium for Grade VIII energy topics at SMP Negeri 6 Samarinda was developed through three phases of the ADDIE framework: Analysis, Design, and Development. The Analysis phase identified learning needs and challenges, the Design phase involved formulating learning objectives and organizing instructional content, and the Development phase produced the learning media prototype and evaluated its feasibility. The validation results showed that the material expert, media expert, and subject teacher assessments reached 84.00%, 86.00%, and 96.00%, respectively, while the overall student response score was 92.11%, categorized as “Excellent.” These findings indicate that the developed learning media meets the feasibility criteria and has the potential to support physics learning on energy topics. The validated prototype can also serve as a foundation for further software implementation and integration into classroom learning.

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Conflict of Interest

The authors declare that they have no conflict of interest related to this study.

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Author Contributions

D.A.Z.P. contributed to conceptualization, methodology, investigation, data curation, formal analysis, and writing the original draft. Z.H., M.S., and N.F.S. contributed to supervision, validation, and reviewing and editing the manuscript, according to their respective roles. All authors reviewed and approved the final version of the manuscript and agreed to be accountable for their contributions.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Ethics Approval and Consent to Participate

This study did not undergo formal ethics committee review. The research was conducted at SMP Negeri 6 Samarinda with the school's permission. The authors should ensure that any applicable institutional requirements regarding informed consent and participation of student minors were fulfilled.

Generative AI Declaration

The authors declare that no generative artificial intelligence (AI) tools were used in the preparation or writing of this manuscript.

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