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Development of Math Fun: An Android-Based learning Media Assisted by iSpring for Elementary Mathematics

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Abstract

The limited availability of mathematics learning media and the growing tendency of students to prefer smartphones over textbooks, presents challenges to the elementary learning process. Furthermore, advances in digital technology also offer opportunities to develop more engaging and interactive instructional media. Therefore, this research sought to design and evaluate a learning application, Math Fun, focused on the topic of two-dimensional (2-D) shapes for fourth-grade elementary students, as well as to assess its feasibility and user responses. The research employed a Research and Development (R&D) approach following the ADDIE instructional design model. Data were collected through observation, interviews, validation questionnaires, user response questionnaires, and a post-learning test. Validation results demonstrated a high level of feasibility, with scores of 89.58% from the material expert, 91.67% from the media expert, and 90% from the IT expert, each categorized as feasible. A limited trial involving 22 fourth-grade students from an elementary school in Garut Regency, West Java yielded a student response rate of 91.43% (excellent) and an average post-test score of 77.14, indicating that the learning objectives were successfully achieved. The findings

confirm that Math Fun is a feasible and effective Android-based interactive learning medium for teaching 2-D shapes to fourth-grade elementary students.

Keywords: *android, mathematics learning media, math fun.*

Abstrak

Keterbatasan ketersediaan media pembelajaran matematika dan meningkatnya kecenderungan siswa yang lebih memilih smartphone daripada buku teks, menghadirkan tantangan bagi proses pembelajaran di sekolah dasar. Di samping itu, kemajuan teknologi digital juga menawarkan peluang untuk mengembangkan media pembelajaran yang lebih menarik dan interaktif. Oleh karena itu, penelitian ini berupaya merancang dan mengevaluasi aplikasi pembelajaran, Math Fun, yang berfokus pada topik bentuk dua dimensi (2-D) untuk siswa sekolah dasar kelas empat, serta menilai kelayakannya dan respons pengguna. Penelitian ini menggunakan pendekatan Penelitian dan Pengembangan (R&D) mengikuti model desain instruksional ADDIE. Data dikumpulkan melalui observasi, wawancara, kuesioner validasi, kuesioner respons pengguna, dan tes pasca-pembelajaran. Hasil validasi menunjukkan tingkat kelayakan yang tinggi, dengan skor 89,58% dari ahli materi, 91,67% dari ahli media, dan 90% dari ahli TI, yang masing-masing dikategorikan layak. Uji coba terbatas yang melibatkan 22 siswa kelas empat SD di Kabupaten Garut, Jawa Barat menghasilkan tingkat respons siswa sebesar 91,43% (sangat baik) dan skor rata-rata postes sebesar 77,14, yang menunjukkan bahwa tujuan pembelajaran telah tercapai. Temuan ini menegaskan bahwa Math Fun merupakan media pembelajaran interaktif berbasis Android yang layak dan efektif untuk mengajarkan bangun ruang dua dimensi kepada siswa SD kelas empat.

Kata kunci: *android, media pembelajaran matematika, math fun.*

INTRODUCTION

Education has become a cornerstone of students' intellectual and emotional development (Gunardi et al., 2024). In the 21st century, through education, students can foster higher-order thinking skills, creativity, and problem-solving abilities, aligned with global competencies (OECD, 2019). Education relies fundamentally on the educational learning process (Pratiwi et al., 2021), a structured interaction between educators and students within a learning environment (Yestiani & Zahwa, 2020). Effective learning is structured to guide and assist students in acquiring knowledge while fostering cognitive, affective, and psychomotor development (Subedi, 2022). One subject that requires the integrated involvement of those three aspects is mathematics. Furthermore, mathematics cultivates logical thinking, attentiveness, and problem-solving skills applicable to daily life (Yanti Ginanjar, 2019).

As a fundamental discipline, mathematics is crucial for developing logical, systematic, and critical thinking skills from primary education (Pratiwi Vidya, 2024). According to the National Council of Teachers of Mathematics, a key objective of school mathematics was not only the mastery of core concepts and procedures but also the cultivation of problem-solving and mathematical reasoning abilities, which provide a foundation for other academic domains (Siswanto, 2024). Indeed, a strong proficiency in mathematics at the primary level supports the educational process at subsequent levels (Carlian et al., 2018). However, numerous studies indicated that primary school students often exhibit low engagement and motivation in learning mathematics (Radišić & Baucal, 2024; Yolanda; Nurani, D. C.; Safitri, 2023). This

issue occurred due to the abstract nature of the content and the limited availability of interactive learning media (Iyamuremye & Burns, 2025).

Geometry, particularly two-dimensional shapes/plane figures, requires greater visualization and spatial understanding abilities than other mathematical topics. Rahayu et al. (2020) highlighted that geometry is a field of mathematics with concrete-abstract characteristics, which can make it difficult for primary school students to understand its concepts when delivered only symbolically. Visualization became a key component in helping students connect real-world shapes with their mathematical representations (Jones K, 2003). Therefore, using visually based interactive learning media is an effective way to optimize comprehension of plane figure concepts.

Fourth-grade teachers and students at a public primary school in Garut Regency participated in a preliminary study through classroom observations and interviews. The observations revealed that the mathematics learning process, particularly for plane figures, remained dominated by conventional, teacher-centered methods. The learning media typically consisted of textbooks and blackboards, lacking interactive tools to engage with concepts visually. Interviews with teachers revealed that most students showed low interest in learning and struggled to understand the shapes and properties of plane figures because there were no media aids to display objects dynamically. Conversely, students were accustomed to using smartphones in their daily activities but did not use them for learning. These findings emphasized the urgency for developing an interactive, engaging Android application-based learning medium suited to the characteristics of primary school learners.

The development of learning media is fundamentally grounded in learning theories that emphasize active student involvement in knowledge construction. Constructivist theory advised that learning becomes more meaningful when students interact directly with objects or contextual learning situations (Piaget, 1971). Aligning with this, Mayer's (2009) multimedia learning theory states that combining text, images, audio, and animation can enhance conceptual understanding by engaging dual cognitive channels during learning. Therefore, the design of digital learning media was carried out systematically to ensure that it was not only visually engaging but also aligned with the principles of effective instructional design (Clark & Mayer, 2016).

This study introduced a novel approach to developing and integrating an Android application-based learning medium, assisted by iSpring, for teaching plane figures in primary schools. Unlike previous studies that generally used iSpring solely for interactive PowerPoint-based media (Febriyanti & Sari, 2022; Nuraini & Narimo, 2019), this research integrated iSpring, Canva, PowerPoint, and APK Duo Builder to produce an Android application that is usable without an internet connection. Furthermore, prior research predominantly focused on improving learning outcomes or interest (Batubara, 2021; Muchtar et al., 2021), whereas this study emphasized the media development process along with the validity, practicality, and effectiveness of the resulting product. An additional original aspect involved the inclusion of an educational game feature specifically designed by the researcher to enhance interactivity and student engagement in learning geometry. Thus, this study contributed new knowledge in developing digital learning media that are not only interactive and engaging but also practically implementable in primary school environments.

Based on this rationale, this study aimed to develop an Android application-based mathematics learning medium, named "Math Fun," assisted by iSpring, as an interactive learning tool for plane figure material for fourth-grade primary school students. The research focused on testing the product's validity, practicality, and effectiveness as an initial step toward developing digital learning media that meet educational needs in the technology era.

METHODS

This study employed a Research and Development (R&D) approach, which was appropriate for the objective of developing a learning medium with high validity (Abdurrahman, 2024). The R&D approach provided a systematic process for designing, developing, and testing a product's effectiveness (Rahayu, 2025). The specific development model adopted was the ADDIE model, chosen for its systematic, structured procedures and the inclusion of evaluation at each stage, which forms the basis for subsequent development (Samsudin et al., 2021).

The research was conducted at an elementary school in Garut Regency, specifically at SD Negeri 4 Sukamaju, involving 22 fourth-grade students during the second semester of the 2024/2025 academic year. The small-scale trial of the developed learning media involved 7 purposively selected students, whose number was determined based on sample size calculations adjusted to the total population and the variation in students' academic abilities (Sukserm, 2024). This sample size was considered representative for the preliminary feasibility testing of the developed learning media. The research procedure followed the five sequential stages of the ADDIE model, as detailed below.

Analysis

The initial phase involved analyzing learning needs. Data were collected through classroom observations and interviews with classroom teachers. The findings from this stage served as the foundation for designing a product that was relevant and addressed specific needs.

Design

The design phase focused on creating the blueprint for the proposed learning medium. This process began with the creation of an initial prototype, followed by the design of the application workflow and user interface and the integration of learning materials tailored to student needs identified in the analysis phase. This stage also included the conceptualization of an educational game feature, intended to function as an engaging tool for material evaluation.

Development

The development phase constituted the core of the product creation process. During this stage, the learning medium was constructed according to the pre-established designs using several supporting software applications. The completed application then underwent a validation process conducted by three experts: a subject matter expert, a media design expert, and an information technology expert. They assessed content appropriateness, material presentation accuracy, visual design, interactivity, and system performance. The validation results served as the basis for revisions to produce a viable, high-quality product.

Implementation

Following validation and subsequent revisions, the medium was deemed valid for student testing. The implementation phase involved a limited-scale trial with elementary school students. 7 of 22 fourth-grade students at a school in Garut Regency joined the trial. The implementation process included providing explanations and guidance on how to use the medium, with facilitation throughout the session to ensure it proceeded as planned.

Evaluation

The final phase was evaluation. The evaluation was applied both formatively and summarily. Formative evaluation occurred throughout the development process to identify and rectify deficiencies at each stage. The summative evaluation followed the implementation to assess the medium's overall effectiveness. The evaluation results informed the final revisions before the learning medium was ready for wider use in elementary school mathematics instruction.

In collecting data, this study employed several techniques: observation, interviews, questionnaires, and tests. This study engaged observations and interviews to understand the actual conditions of the learning process in schools, particularly regarding the availability and use of learning media. Two types of questionnaires were administered: a media validation questionnaire and a student response questionnaire, the latter used during the trial stage to gauge effectiveness. Additionally, a test was administered at the end of the instructional session to measure the extent to which the developed medium aided student comprehension, thereby providing supporting data for the medium's effectiveness.

The research instruments consisted of an expert validation sheet and a student response questionnaire. Experts used the validation sheet to assess the learning medium based on three aspects: content, media design, and technology. The limited trial used the student response questionnaire to determine the medium's practicality. Both instruments were developed based on indicators aligned with learning media development theory and tailored to the specific medium's characteristics. The questionnaires utilized a Likert scale to measure respondent feedback.

Tabel 1. Likert Scale Score Assessment Guidelines

Qualitative Data	**Score**
Feasible	4
Fairly Feasible	3
Not Feasible	2
Very unfeasible	1

Source: (Wahyudi, 2022)

The data analysis processed and interpreted the results from the various data collection techniques to assess the feasibility, practicality, and effectiveness of the developed learning medium. The analytical methods included qualitative and quantitative descriptive analyses, selected based on the characteristics of the data obtained (Sugiyono, 2019). This analysis aimed to depict the real-world conditions and provide a basis for improving the developed media.

Quantitative data from the validation by subject-matter, media, and IT experts were analyzed using a Likert scale. The user response questionnaire data were analyzed using a

Guttman scale. To calculate the scores from the validation and student responses, here is the following formula:

$$V = \frac{\text{Tse}}{\text{Tsh}} \times 100\%$$

Source: (Malikah & Jannah, 2023)

Information:
V = Percentage Searched
Tse = Total of Actual Scores
Tsh = Total of Maximum Ideal Scores

The assessment scores were then converted to qualitative categories to facilitate data interpretation. This conversion was based on a score conversion table used to assess the feasibility and practicality of the medium, allowing the numerical data to be interpreted descriptively.

Table 2. Likert Scale Categories

No.	Feasibility Criteria (%)	Validity Level	Conversion
1	85,01 -100	It is highly valid and could be used without revision.	Suitable
2	70,01-85,00	Valid, could be used with minor revisions.	
3	50,01-70,00	It is less valid and not recommended for use as it requires major revisions.	Unsuitable
4	01,00-50,00	It is invalid and should not be used.	

Table 2 presents the classification criteria for interpreting the validity level of the developed learning media based on Likert scale analysis. These categories help determine whether the media requires revision or can be directly implemented, following the guidelines proposed by (Wahyudi, 2022).

Table 3. Guttman Scale Categories

No	Percentages (%)	Category
1	0-20	Very unsuitable
2	21-40	Unsuitable
3	41-60	Quite suitable
4	61-80	Suitable
5	81-100	Very suitable

Table 3 displays the Guttman scale categories used to assess the practicality level of the developed learning media. This classification provides a reference for interpreting respondents' responses, adapted from Koriaty & Agustani (2016). Overall, these Research steps were conducted in a structured manner to obtain valid and reliable data regarding the feasibility and practicality of the learning medium (Fatmahanik et al., 2025). The results of the data analysis from the conversion table served as the basis for determining the medium's effectiveness.

RESULTS AND DISCUSSION

This study considered the development of Android application-based learning media called Math Fun, designed for fourth-grade elementary school students who focus on plane shapes. The learning media was developed using the ADDIE model. This research was projected to examine the development process and evaluate the media's feasibility through validation tests and user responses from trial implementations. Each development stage was directed systematically to ensure the product aligned with the intended instructional goals (Moses Adeleke Adeoye et al., 2024)

Analysis

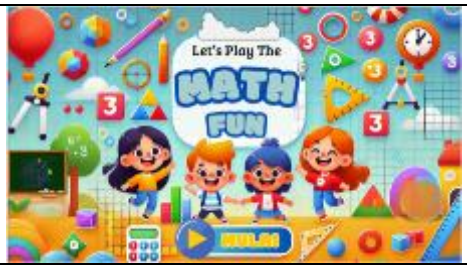
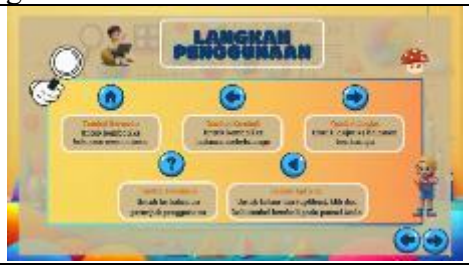
The needs analysis, learner analysis, and curriculum analysis—obtained through observations and interviews—revealed a demand for technology-based learning media that could be easily accessed via smartphones for mathematics, specifically in the geometry element covering plane shapes for fourth-grade students. These analytical results were the foundation for the emerging Math Fun learning media.

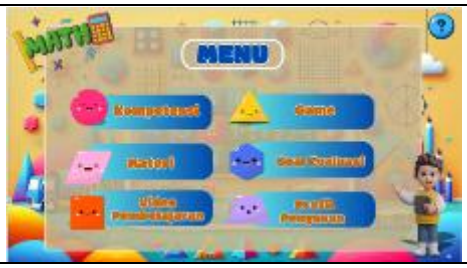
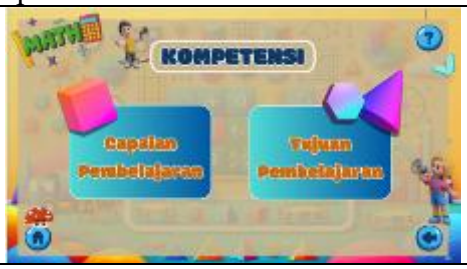
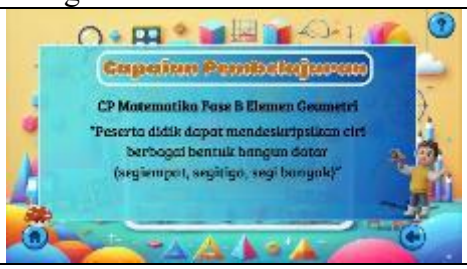
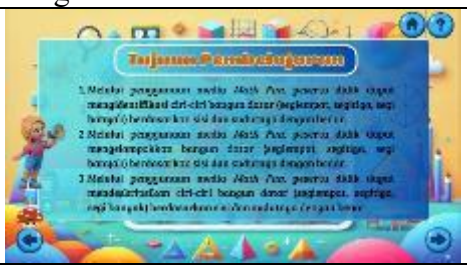
Design

The design phase involved preparing the necessary software for media creation. Several software tools were utilized in the development of Math Fun. Canva was employed to design the visual elements of the learning media, as it provides diverse features such as animations, audio, video, images, graphics, and text that facilitate the creation of engaging instructional materials tailored to learners' needs (Wulandari & Mudinillah, 2022; Janah et al., 2023). PowerPoint was then used to arrange navigation buttons for interactivity and to incorporate background audio and music, creating an enjoyable learning atmosphere. The software's animation and hyperlink features also allowed the creation of an interactive flow between slides, enabling users to navigate the material more efficiently (Lesmana et al., 2023). Furthermore, iSpring was utilized to convert the PowerPoint materials into an HTML5-compatible e-learning format, ensuring accessibility on Android devices that support this format (Ramadhani et al., 2019). Finally, APK Duo Builder was applied to transform the HTML5-based media into an Android application (APK) that could be installed and operated directly on smartphones or tablets without requiring advanced programming skills.

The design phase results were documented in a storyboard outlining the media's framework to streamline development (Kunto et al., 2021). Below were some key components of the "Math Fun" learning media storyboard.

Table 4. Storyboard Math Fun Learning Media

Scene Title	*Scene 1*	Scene Title	*Scene 2*
Welcome Screen		Usage Instructions	
			
Initial application display		Steps for operating the Math Fun application	

Scene Title Main Menu	*Scene 3*	Scene Title Competencies	*Scene 4*
			
The main menu displays various menu buttons		Competencies consisting of learning outcomes	
Scene Title Learning Outcomes	*Scene 5*	Scene Title Learning Outcomes	*Scene 6*
			
Displaying the learning outcomes for Geometry (Element B)		Displaying the learning objectives derived from the learning outcomes	

Development

The development of Math Fun media was based on the storyboard designed in the previous stage. The process involved creating the media using supporting software, conducting validity testing, and refining the media based on the validity test results and feedback from expert validators.

The visual design of the media was entirely developed in Canva and then integrated into PowerPoint to incorporate interactive elements such as navigation buttons, animations, background music, and explanatory audio. After the complete media was designed in PowerPoint, the file was exported into HTML5 format using iSpring Suite. Subsequently, the HTML5 file was converted into an Android application via APK Duo Builder to ensure direct smartphone accessibility. This process ensured that the developed media was visually engaging, user-friendly, and easily accessible.

Math Fun media embraced an instructional and relational comprehension training game designed entirely in Canva and PowerPoint without external web integration. This game menu was an innovation that complements the learning media application by providing an enjoyable yet educational feature—an aspect not previously found in prior developmental research.

The completed media Math Fun was assessed for feasibility through a media validation test conducted by subject matter experts, media experts, and IT experts. The subject matter experts evaluated the content, the media experts assessed various aspects of the media, and the IT experts reviewed the technical aspects of the media. The assessment was carried out using a validation instrument.

Table 5. Results of the Content Validation by Subject Experts

No.	Aspect	Indicator	Score Obtained
1	Relevance	Alignment of objectives with the curriculum	4
2		Alignment of material with learning outcomes	4
3		Alignment of material with learning objectives	4
4		Depth of material relative to student development level	4
5	Content	Consistency of concepts and definitions	2
6		Appropriateness of material scope	4
7		Relevance of illustrations to the material	4
8	Instruction	Systematic presentation of learning content	3
9		Use of language following PUEBI	4
10	Motivation	The material incorporates motivational elements	4
11	Evaluation	Relevance of questions to competencies	3
12		Appropriateness of question quantity for student development level	3
Total Score Obtained			43
Percentage Score			89,58%

Source: (Angwarmasse & Wahyudi, 2021), modified instrument.

Based on Table 5, it could be established that the media validation test by subject matter experts yielded a percentage of 89.58%. This percentage was within the 80.01–100% range, categorized as highly suitable (Wahyudi, 2022).

Table 6. Media Specialist Validation Results

No.	Aspect	Indicator	Score Obtained
1	*Layout*	Background Design	3
2		Neatness of design	3
3		Display of images, animations, and videos	3
4	Text	Font type	4
5		Font size	4
6		Font color selection	3
7		Text placement	4
8		Language usage	4
9	Pemprograman	Background music selection	4
10		Clarity of usage flow	4
11		Ease of button navigation	4
12		Usage instructions	4
Percentage Score			44
Total Score Obtained			91,67%

Source: (Angwarmasse & Wahyudi, 2021), modified instrument.

Based on Table 6, media specialist validation results obtained a percentage of 91.57%, within the 80.01–100% range, and categorized as highly suitable (Wahyudi, 2022).

Table 7. IT Expert Validation Results

Aspect	Indicator	Obtained Score
Functionality	Features function properly	4
	Smooth integration between features	3

Aspect	Indicator	Obtained Score
	Uninterrupted accessibility of multimedia features	4
System Performance	System stability	4
	Smooth media accessibility	4
	Fast and standardized system response time	4
Navigation	Availability of user guides	3
	Smooth loading when switching pages/menus	4
Interactivity	Media elements align with learning objectives (LO)	3
	Interactive media elements	3
Total Obtained Score		36
Percentage Score		90%

Source: (Sunwinarti, 2016), modified instrument.

Table 7 revealed that the media validation test by IT experts obtained a 90% percentage. This 80.01–100% percentage categorized as highly feasible (Wahyudi, 2022).

Following the validation test, Math Fun media was revised based on responses from the experts. The material expert validator provided several suggestions, including (1) adjusting the definition of quadrilaterals to align with the illustrations used, (2) displacing the developer profile to the end section, (3) designing questions that train relational understanding, and (4) adding image-based questions. The media expert recommended improvements to the visual display, such as (1) substituting the background with a simpler image, (2) checking images aligned with the subject matter, and (3) applying softer font colors. Meanwhile, the IT expert suggested enhancements to game features and the addition of audio for material explanations.

Improvements to Math Fun media addressed all expert feedback and critiques to ensure material accuracy, a visually supportive learning display, and complete features that facilitate students' understanding of the subject matter.

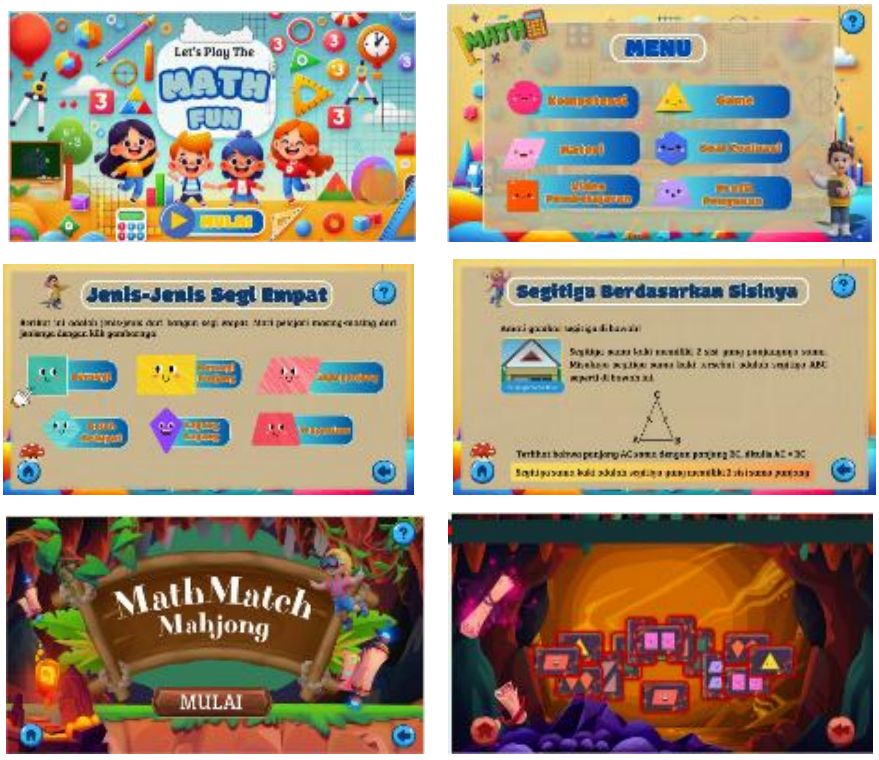


Figure 1. The Math Fun Application Interface

The final product of the Math Fun application contained a welcome scene, usage instructions, a main menu, competency objectives, and learning materials covering quadrilaterals, triangles, and polygons. Each material section provided explanations of concepts, types, examples, and practice questions, accompanied by illustrations, audio, and animations. Additionally, the application featured a game with three difficulty levels, instructional videos, a final evaluation test, and a developer profile section at the end of the application. The Math Fun application resulting from this development can be downloaded from the following link: https://drive.google.com/drive/folders/1IuZjp2N8XoisI0mwwlBL_cCfx1I4A29U

Implementation (Implementasi)

During the implementation phase, the learning media was conducted on a small scale to evaluate its effectiveness before broader deployment. The trial involved seven fourth-grade students selected based on their proficiency levels determined by their classroom teacher. This selection intended to ensure that the media was tested by students with varying levels of comprehension, thereby assessing its effectiveness across learners with low, medium, and high mathematical understanding.

Throughout the trial, the students demonstrated strong proficiency in using the application-based learning media. They effectively navigated between pages, interacted with animated elements, and accessed the embedded educational games without difficulty.

Table 8. Results of Small-Scale Student Questionnaire Responses

Aspects	Questions	Score Total	Percentages
Content Quality	Do you like the material presented in the Math Fun application?	7	100%
	Are the images and colors in the Math Fun application visually appealing?	7	100%
	Can you easily understand the material's content in the Math Fun application?	5	71,43%
Ease of Use	Can you access the Math Fun application easily?	7	100%
	Does the Math Fun application make learning more enjoyable?	5	71,43%
	Is the Math Fun application user-friendly?	7	100%
Motivation	Have you read the material and completed the exercises provided in the Math Fun application?	7	100%
	Do you feel more enthusiastic about learning when using the Math Fun application?	7	100%
	After using the Math Fun application, have you developed a greater interest in mathematics?	5	71,43%
	Are the buttons in the Math Fun application easy to operate?	7	100%
	Average		92,43%

Source: (Angwarmasse & Wahyudi, 2021), modified instrument.

The analysis results obtained from the user response questionnaire on the small-scale trial disclosed a score of 91.43%, categorized as highly feasible (Koriaty & Agustani, 2016) (Korianty & Agustani, 2016). During the small-scale trial, students completed the user

response questionnaire and an end-of-evaluation test to measure their learning outcomes after using the Math Fun instructional media

Table 9. Evaluation Test Score Results

No.	Name	Score	Description
1	NH	90	Complete
2	RS	80	Complete
3	NI	80	Complete
4	MF	70	Not Complete
5	ZS	80	Complete
6	RF	60	Not Complete
7	MK	80	Complete

The average score achieved by the students was 77.14, exceeding the Learning Objective Achievement Criteria (KKTP) of 76. Out of the seven students who participated in the trial, five were deemed to have met the passing standard, while two had not yet achieved it.

Evaluation

The study systematically developed Math Fun, a learning media for Math Fun, an Android application supported by iSpring, following all stages of the ADDIE model, from needs analysis to evaluation. Each stage contributed to refining the media's design to align with the characteristics of elementary school students and mathematics learning competencies. This finding supports Molenda (2003), view that the ADDIE model is an effective approach for ensuring the integration of design, development, and implementation of learning products.

Expert validation results indicated that the Math Fun media met the "feasible" criteria in content, display, interactivity, and ease of use. The results align with the theories of (Arsyad, 2019) and (Sadiman A. S. & Rahardjito, 2010), who emphasized the importance of content quality and technical aspects of learning media to ensure message accessibility and clarity. In user trials, students rated the press as engaging, user-friendly, and helpful for visualizing geometric concepts. This outcome reinforces the findings of Purnama et al. (2021), who stated that Android-based media with interactive designs can enhance the effectiveness of learning communication at the elementary school level. This finding aligns with the study by Schoenherr et al. (2024), which demonstrated that interactive visualization in mathematics learning can significantly enhance students' conceptual understanding. Poçan et al. (2023), emphasized that mobile technology contributes to strengthening students' motivation and learning outcomes, thereby supporting the use of media such as Math Fun.

Based on the final evaluation conducted after students used the Math Fun media, the average score obtained was 77.14, which exceeded the Learning Objective Mastery Criteria of 76**.** This indicates that most students achieved learning mastery. Of the seven students who participated in the trial, five were classified as achieving mastery, while two had not yet reached it. These results suggest that the Math Fun media has the potential to help students better understand the concept of plane figures. This finding aligns with Hidayat and Nizar (2021), who stated that Android-based interactive learning media can facilitate conceptual understanding through visually engaging and easily comprehensible presentations. Similar

support was also expressed by Hwang & Wu (2012) and Zou et al. (2021), who asserted that mobile learning and digital game-based learning have the potential to enhance student engagement and the effectiveness of mathematics learning.

This study reinforces previous findings on the effectiveness of iSpring in developing digital learning media. The integration of iSpring in the Math Fun application has been shown to facilitate visual material presentation and enhance student engagement in mathematics learning. These results are consistent with the studies by Batubara (2021); Hula et al. (2024); and Nuraini & Sutama (2020), which demonstrated that the use of iSpring Suite is effective in developing Android-based interactive learning media that attract students' attention and support conceptual understanding. Similar support was also expressed by Hwang & Wu (2012), who asserted that interactive mobile learning can improve student engagement and the effectiveness of mathematics instruction.

The overall findings demonstrated that the Math Fun media was not only valid and practical but also had the potential to serve as an alternative for teachers in providing independent, engaging learning media. By adhering to the principles of multimedia learning (Mayer, 2009) and mobile learning design (Traxler, 2018), this media can form a foundation for further Research assessing its effectiveness on student learning outcomes.

CONCLUSION

The Math Fun learning media is an Android application for fourth-grade elementary school students to learn about plane shapes developed using the ADDIE model. The development process was based on thorough analysis. The creation of Math Fun utilized iSpring to transform it into an Android application. The media has been validated by subject matter experts, media specialists, and IT experts, with results signifying high suitability. Preliminary trials yielded favorable student feedback, with assessment results indicating that most participants achieved learning proficiency. These findings revealed that Math Fun is an effective supplementary learning medium for gaining student engagement and conceptual understanding of geometry. However, a current limitation is its exclusive compatibility with the Android platform, lacking iOS support. Therefore, future developers are advised to consider improving cross-platform compatibility.

REFERENCES

Abdurrahman. (2024). Research and Development Methods in Islamic Education. *RABBAYANI Jurnal Pendidikan Dan Peradaban Islam*, *4*(1), 26–41. https://e-journal.staima-alhikam.ac.id/rabbayani/article/view/2610

Adeoye, M. A., Wirawan, K. A. S. I., Pradnyani, M. S. S., & Septiarini, N. I. (2024). Revolutionizing education: Unleashing the power of the ADDIE model for effective teaching and learning. *JPI (Jurnal Pendidikan Indonesia)*, *13*(1), 202-209. https://doi.org/10.23887/jpiundiksha.v13i1.68624

Angwarmasse, P., & Wahyudi, W. (2021). Pengembangan game edukasi labirin matematika untuk meningkatkan kemampuan pemecahan masalah siswa kelas VI sekolah dasar. *Jurnal EDUCATIO: Jurnal Pendidikan Indonesia*, *7*(1), 46. https://doi.org/10.29210/120212953

Arsyad, A. (2019). *Media pembelajaran*. Rajawali Pers.

Carlian, Y., Pratiwi, I. M., Guru, P., Ibtidaiyah, M., Tarbiyah, F., Keguruan, D., Islam, U., Sunan, N., & Djati Bandung, G. (2018). Mengembangkan Pemahaman Matematis Siswa Madrasah Ibtidaiyah Melalui Lembar Kegiatan Siswa Berbasis Kearifan Lokal. *JMIE : Journal of Madrsah Ibtidaiyah Education*, *2*(1), 74–86. https://doi.org/http://dx.doi.org/10.32934/jmie.v2i1.60

Fatmahanik, U., Afifah, A., Fauziah, H. N., & David, M. (2025). Development of a Supplementary Geometry Book Integrating Realistic Mathematics Education and Reog Ponorogo Ethnomathematics to Improve Elementary Students' Numeracy Literacy. *Al Ibtida: Jurnal Pendidikan Guru MI*, *12*(1), 45. https://doi.org/10.24235/al.ibtida.snj.v12i1.20103

Febriyanti, D. F., & Sari, P. M. (2022). Pengembangan Media Pembelajaran Berbasis Literasi Sains Menggunakan Software Ispring Suite 9 pada Pembelajaran IPA. *Jurnal Basicedu*, *6*(4), 6620–6629. https://doi.org/10.31004/basicedu.v6i4.3323

Ginanjar, A. Y. (2019). Pentingnya penguasaan konsep matematika dalam pemecahan masalah matematika di SD. *Jurnal Pendidikan UNIGA*, *13*(1), 121-129. https://doi.org/https://doi.org/10.52434/jp.v13i1.822

Gunardi, A., Hasani, A., & Nulhakim, L. (2024). The important role of education: Learning components as a source of emotional intelligence for social interaction. *Cendikia : Media Jurnal Ilmiah Pendidikan*, *14*(3), 196–196. https://doi.org/https://doi.org/10.35335/cendikia.v14i3.4625

Hayyuningtyas, K., & Batubara, H. H. (2021). Pengembangan Media Pembelajaran Interaktif Berbasis Powerpoint Dan Ispring Di Android Untuk Meningkatkan Efektifitas Pembelajaran Ipa Di Kelas 3 Sd. *MUBTADI: Jurnal pendidikan ibtidaiyah*, *3*(1), 61-69.

https://doi.org/https://doi.org/10.19105/mubtadi.v3i1.4804

Hula, I. R. N., Loni, J., & Sarif, S. (2024). Development of Android-Based Learning Media Using iSpring Suite to Improve Arabic Vocabulary Mastery Among Students: Pengembangan Media Pembelajaran Berbasis Android Menggunakan iSpring Suite untuk Meningkatkan Penguasaan Kosakata Bahasa Arab Siswa. *Edulab: Majalah Ilmiah Laboratorium Pendidikan*, *9*(2), 222–239.

Hwang, G.-J., & Wu, P.-H. (2012). Advancements and trends in digital game-based learning research: A review of publications in selected journals from 2001 to 2010. *British Journal of Educational Technology*, *43*(1).

Iyamuremye, E., & Burns, D. (2025). Concrete-Pictorial-Abstract instruction: enhancing students' learning motivation and achievement in mathematics. *Cogent Education*, *12*(1). https://doi.org/10.1080/2331186X.2025.2558303

Jones Keith. (2003). *Issues in the teaching and learning of geometry*. Routledge.

Koriaty, M., & Agustani, H. (2016). *Pengembangan Media Pembelajaran Interaktif*. Alfabeta.

Kunto, I., Ariani, D., Widyaningrum, R., & Syahyani, R. (2021). Ragam Storyboard Untuk Produksi Media Pembelajaran. *Jurnal Pembelajaran Inovatif*, *4*(1), 108–120. https://doi.org/10.21009/jpi.041.14

Malikah, B. U., & Jannah, A. N. (2023). *Analisis Kevalidan Pengembangan Ensiklopedia Tematik Tema 5 Subtema 1 Kelas Iii Sekolah Dasar*.

Mayer, R. E. (2009). *Multimedia learning*. Cambridge University Press.

Molenda, M. (2003). In search of the elusive ADDIE model. *Performance Improvement*.

Muchtar, F. Y., Nasrah, N., & Ilham S, M. (2021). Pengembangan Multimedia Interaktif Berbasis I-Spring Presenter untuk Meningkatkan Keterampilan Berpikir Kritis Siswa Sekolah Dasar. *Jurnal Basicedu*, *5*(6), 5520–5529. https://doi.org/10.31004/basicedu.v5i6.1711

Nuraini, I., & Sutama, S. (2020). Pengembangan media pembelajaran berbasis power point Ispring Suite 8 di sekolah dasar. *Jurnal Varidika*, *31*(2), 62-71. https://doi.org/10.23917/varidika.v31vi2i.10220

OECD. (2019). Well-being 2030 Action OECD Future Of Education And Skills 2030 A Series Of Concept Notes. In *AN OECD Learning Framework 2030* (pp. 23–25). Spinger.

Piaget, J. (1971). Inconscient affectif et inconscient cognitif. In *Raison présente* (Vol. 19, Issue 1, pp. 11–20). Inconscient affectif et inconscient cognitif. Raison présente.

Poçan, S., Altay, B., & Yaşaroğlu, C. (2023). The effects of mobile technology on learning performance and motivation in mathematics education. *Education and Information Technologies*, *28*(1), 683–712.

Pratiwi Vidya, B. H. (2024). *Analisis Kemampuan Berpikir Kritis Siswa pada Mata Pelajaran Matematika Kelas V di MI Jauharul UlumInfo Artikel*. https://doi.org/https://doi.org/10.63440/mutiarapgsd.v1i1.6

Pratiwi, I. M., Kariadinata, R., & Apriani, L. (2021). Does math mini laboratory improve pedagogical content knowledge for prospective teacher of madrasah ibtidaiyah? *Journal of Physics: Conference Series*, *1806*(1). https://doi.org/10.1088/1742-6596/1806/1/012053

Purnama, S., Ulfah, M., Machali, I., Wibowo, A., & Narmaditya, B. S. (2021). Does digital literacy influence students' online risk? Evidence from Covid-19. *Heliyon*, *7*(6).

Radišić, J., & Baucal, A. (2024). Mathematics motivation in primary education: building blocks that matter. *European Journal of Psychology of Education*, *39*(2), 1505–1512. https://doi.org/10.1007/s10212-024-00832-7

Rahayu, A. (2025). Metode penelitian dan pengembangan (R&D): Pengertian, jenis dan tahapan. *DIAJAR: Jurnal Pendidikan dan Pembelajaran*, *4*(3), 459-470. https://doi.org/10.54259/diajar.v4i3.5092

Rahayu, E., Hidayatillah, W., Islam, U., Hasan, Z., & Probolinggo, G. (2020). Analisis Pembelajaran Geometri Siswa Sekolah Dasar. *BAHTSUNA: Jurnal Penelitian Pendidikan Islam*. https://doi.org/https://doi.org/10.55210/bahtsuna.v2i2.33

Sadiman A. S. & Rahardjito. (2010). *Media pendidikan: Pengertian, pengembangan dan pemanfaatannya*. RajaGrafindo Persada.

Salmah, S., Arief, Z. A., & Fatonah, U. (2024). Analisis Kebutuhan Media Pembelajaran Kelas Iii Di Sdn Ciapus 05. *Literasi Pendidikan Dasar*, *4*(1), 1–6. https://pkm.uika-bogor.ac.id/index.php/PTP/article/view/2379/1653

Samsudin, R., Sulaiman, R., Guan, T. T., Yusof, A. M., Firdaus, M., & Yaacob, C. (2021). Mobile Application Development Trough ADDIE Model. *International Journal of Academic Research in Progressive Education and Development*, *10*(2), 1017–1027. https://doi.org/10.6007/IJARPED/v10-i2/10328

Schoenherr, J., Strohmaier, A. R., & Schukajlow, S. (2024). Learning with visualizations helps: A meta-analysis of visualization interventions in mathematics education. *Educational Research Review*, *45*, 100639. https://doi.org/https://doi.org/10.1016/j.edurev.2024.100639

Siswanto, E. (2024). Kemampuan Pemecahan Masalah pada Pembelajaran Matematika: Systematic Literature Review. *Jurnal Riset Pembelajaran Matematika Sekolah*, *8*. https://doi.org/https://doi.org/10.21009/jrpms.081.06

Subedi, U. (2022). Indispensability of integrating three Learning Domains in Teaching and Learning. *Shaheed Smriti Journal*, *11*(8), 54–60. https://doi.org/10.3126/shaheedsmriti.v11i8.76664

Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

Sukserm, P. (2024). Determining the Appropriate Sample Size in EFL Pilot Studies. *Journal of Research Methodology*, *37*(3). https://doi.org/10.14456/jrm.2024.13

Sunwinarti. (2016). *Pengembangan media pembelajaran berbasis web untuk meningkatkan hasil belajar dasar-dasar mesin kelas X di SMK Negeri 3 Buduran Sidoarjo*. Doctoral dissertation, State University of Surabaya.

Traxler, J. (2018). Learning with Mobiles in the Digital Age. *Pedagogika*, *68*(3). https://doi.org/10.14712/23362189.2018.860

Wahyudi, T. (2022). Pengembangan Aplikasi Berbasis Web dan Android Sebagai Penunjang Kerja di Indonesia: Systematic Literature Review. *Indonesian Journal Computer Science*, *1*(2), 96–102. https://doi.org/10.31294/ijcs.v1i2.1428

Yestiani, D. K., & Zahwa, N. (2020). Peran Guru dalam Pembelajaran pada Siswa Sekolah Dasar. *Fondatia*, *4*(1), 41–47. https://doi.org/10.36088/fondatia.v4i1.515

Zou, D., Huang, Y., & Xie, H. (2021). Digital game-based vocabulary learning: where are we and where are we going? *Computer Assisted Language Learning*, *34*(5–6), 751–777. https://doi.org/https://doi.org/10.1080/09588221.2019.1640745