

DEVELOPMENT OF INTERACTIVE LEARNING MEDIA ASSISTED BY SMART APPS CREATOR 3 IN SPLDV MATERIALS TO INCREASE STUDENTS' LEARNING INTEREST

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Abstract

Technological advances require innovation in the learning process that is in line with the characteristics of today's students. This study aims to develop an interactive learning media based on Smart Apps Creator 3 (SAC) on the Two-Variable Linear Equation System (SPLDV) material to increase the learning interest of grade VIII junior high school students. This research uses the Research and Development (R&D) method with a 4D development model that includes the stages of Define, Design, Develop, and Disseminate. The subject of the trial was a grade VIII student of State Junior High School 3 Sungguminasa. The results of validation by experts show a validity rate of 90% (very valid category). Practicality assessments from teachers and students show that media is easy to use and engaging, while the effectiveness of media is reflected in students' increased interest in learning during learning. This media has proven to be able to present SPLDV material visually and interactively so as to create a more meaningful learning experience. Therefore, this medium is recommended to be applied more widely in mathematics learning. Further research is suggested to examine the influence of media on learning outcomes and critical thinking skills, as well as to expand implementation to other mathematics materials and various levels of education.

Keywords: *4D Development Model; Interactive Learning Media; Learning Interest; Smart Apps Creator 3; Two Variable Linear Equation System.*

1. INTRODUCTION

The role of education is very significant in creating a knowledgeable, inclusive, and democratic society. For this reason,

reforms in the field of education must continue to be carried out to improve the quality of education in a country [1]. 21st century education requires a paradigm shift in learning methods (Nur et al., 2024). The traditional teacher-centered approach is no longer relevant, and now learning must be more interactive, collaborative, and contextual [3]. The use of technology in the learning process is no longer an option, but a need to prepare future generations [4]. Therefore, educational institutions need to adjust their learning strategies to digital advances and the character of the current generation so that the learning process is more interesting and meaningful. One of them is mathematics learning which is often considered abstract and difficult for students to understand [5].

Mathematics is the main subject that plays an important role in training students' logical, analytical, and systematic thinking skills. As one of the compulsory and main subjects, mathematics provides a solid foundation for the development of various types of science [6]. Through mathematics learning, students are guided to observe patterns, formulate arguments logically, and understand and solve problems systematically [7]. Logical abilities help learners draw conclusions from available information, while analytical abilities allow them to break down complex problems into simpler parts [8]. Mathematics is not only useful in the context of daily life, but also plays a big role in shaping a logical and orderly way of thinking [9]. Many students still have difficulty understanding mathematics material, especially on the topic of the Two-Variable Linear Equation System which requires an understanding of concepts and proper application.

The System of Two-Variable Linear Equations is an important material taught in the classroom because it is closely related to the concepts of algebra and problem-solving skills. This material requires the ability to think abstractly and master deep concepts. However, in reality, there are still many students who have difficulty in solving the problems of the Two-Variable Linear Equation System [10]. Based on observations in several schools, students' difficulties are increasingly visible when they have to solve problems in the form of stories or real contexts [11]. One of the reasons is the lack of visualization in the presentation of the material causing students to have difficulty understanding the relationship between two variables, either through graphs, tables,

or other mathematical models [12]. This condition shows the need for a more innovative and technology-based learning approach so that students' understanding of the linear equation system of variables can be improved.

The limited variety of learning media used by teachers also contributes to the low level of students' understanding of the concept of a linear equation system of variables. The learning process is still dominated by lectures and the use of package books as the only source, so that students get bored quickly and lack enthusiasm in following lessons [13]. The lack of interest of students in learning mathematics, especially in the material of the linear equation system of variables is one of the main obstacles that hinder the creation of an effective learning process. If learning motivation is minimal, students tend to be passive and reluctant to explore mathematical concepts more broadly [14]. For this reason, it is important to conduct further research on real conditions in the field to see how these factors are reflected in the mathematics learning process, as well as how it impacts students' learning interests.

Interest in learning is one of the key factors that affect the success of learners in the learning process. High interest in a subject encourages students to be more active, focused, and enthusiastic in learning, so that the material presented is easier to understand and remember [15]. In mathematics learning, interest in learning is often a challenge because many students have difficulty understanding the abstract and procedural concepts being taught [16]. Therefore, increasing interest in learning is a strategic step to support the achievement of learning goals. To follow up on these needs, research was conducted to obtain an overview of conditions in the field.

Based on the results of observations conducted in grade VIII of State Junior High School 3 Sungguminasa, it was found that the mathematics learning process, especially in the material of the linear equation system of two variables, is still conventional. The learning process is still dominated by lecture methods and limited use of media. In addition, the active participation of students in the learning process is still low, which has an impact on their learning outcomes. These findings show that the learning process requires innovation, one of which is through the development of digital learning media that is in accordance with the characteristics of current students. Therefore, technology-based learning media such as Smart Apps Creator 3 is needed that is able to present the material of the linear equation system of variables visually,

interactively, and contextually to increase student engagement and understanding.

This is in line with several previous studies that show that SAC-based learning media is effective in improving student learning outcomes. Examples of research by Sudiarti et al (2024) which showed a significant improvement in students' mathematics learning outcomes after using SAC interactive media on transformation materials. Furthermore, in the research conducted by Hello (2023) showed that there was a significant improvement in students' mathematics learning outcomes after using SAC interactive media in the material Building a Flat Side Room. However, the development of SAC learning media for linear equation system materials for variable linear equations is still relatively limited, especially those designed according to the characteristics of junior high school students. Therefore, it is necessary to develop SAC media that is not only visually appealing, but also adjusted to the basic competencies and learning indicators of the linear equation system of variables. In addition, the media developed must go through the validation stage by experts and be tested for practicality and effectiveness in the context of real learning in order to make a real contribution to improving the quality of mathematics education.

Based on these problems, the development of innovative, interactive, and technology-based learning media is needed to make it easier for students to understand the material of the linear equation system of variables more effectively. Smart Apps Creator 3 as an Android-based learning media development platform is considered to have great potential in supporting a fun, visual, and learning process in accordance with the characteristics of junior high school students. Thus, it is necessary to conduct a study on the development of learning media based on Smart Apps Creator 3 on the material of the linear equation system with variables that can support the creation of a more interesting, interactive, and meaningful learning process for grade VIII students of State Junior High School 3 Sungguminasa.

2. RESEARCH METHODS

This research applies *the Research and Development* (R&D) method. The subjects of the study were 20 grade VIII students from the State Junior High School 3 Sungguminasa. The development process follows a 4D model which includes four stages, namely *Definite*, Design, Develop, and Disseminate [19].

The define stage in this model allows researchers to conduct a comprehensive needs analysis, including analysis of students, materials, and learning contexts. The design stage is used to design learning media that is in accordance with the curriculum, indicators of competency achievement, and the need for visualization of linear equation system materials for variables. In the develop stage, the media that has been designed is developed into a real product, then validated by experts and tested to students to see its practicality and effectiveness. Finally, the disseminate stage is carried out to disseminate media to teachers and students, as well as collect feedback that is useful for further development.

The selection of the 4D (Define, Design, Develop, Disseminate) development model in this study is based on the characteristics of a systematic, structured, and oriented model that is oriented towards the development of valid, practical, and effective learning products. This model was developed by [20] and is specifically designed to develop quality learning tools, so that it is very relevant to the purpose of this research, which is to produce interactive learning media based on *Smart Apps Creator 3* that is in accordance with the characteristics of students and mathematics learning needs. The 4D model is considered appropriate because it provides a flexible and continuous improvement-oriented framework, as well as emphasizing the involvement of practitioners and end-users in the development process.

The data analysis technique in this study is adjusted to the development objectives, namely to assess the level of validity, practicality and effectiveness of interactive learning media assisted by *Smart Apps Creator 3* in the material of the linear equation system of two variables. The data collection technique in this study was carried out by observation to see learning activities firsthand, giving questionnaires in the form of a list of questions to teachers and students, as well as pretest and posttest to see students' abilities before and after learning using interactive learning media assisted by *Smart Apps Creator 3* in the material of the linear equation system of two variables.

3. RESULTS AND DISCUSSION

The result of the development research that has been carried out by the researcher is the Smart Apps Creator 3 learning media on the material of the two-variable linear equation system for students in grade VIII of junior high school 3 Sungguminasa. This study aims to evaluate whether the developed media is included in the valid and practical categories. This research and development is carried out through four stages, namely define, design, develop, and disseminate. [19]. The following are the results that researchers obtained from each of these stages:

1. *Define*

This stage aims to identify and formulate needs in learning, especially in the material of linear equation systems of two variables. Results at this stage include:

- Final preliminary analysis: Information was obtained that learning is still conventional and there is minimal use of interactive media.
- Analysis of learners: Learners show low interest and difficulty understanding the concept of two-variable linear equation system.
- Material analysis: The material of the two-variable linear equation system has abstract characteristics and requires a visual presentation to facilitate understanding.
- Analysis of learning tasks: An overview is obtained that students need to be actively involved through interactive and contextual media.

From the results of this stage, it is determined that there is a need for digital learning media that is able to present material visually, attractively, and support students' learning independence.

2. *Design*

At this stage, the researcher begins to design learning media products. The initial design is called a prototype. This design is adjusted to the content of the curriculum and subject matter. After that, the design is checked by an expert to see if it fits and advises if it needs to be fixed. The activities carried out at the design stage, namely:

- Drafting a concept comprehension test

The design of the concept comprehension test is carried out by considering the analysis of the objectives and characteristics of the students. As a result of this analysis, a learning outcome test grid was made that will be used by students before and after using learning media. This test consists of a pretest and posttest with a multiple-choice format and description. Each type of test includes three multiple-choice questions and two description questions, which have been adjusted to the achievement indicators that have been set.

- **Media Selection**

In the media selection process, the researcher determined the use of the Smart Apps Creator 3 application because it was able to present concepts visually and audio, making it more attractive to students. In addition, the app allows accessibility at any time, whether at school or at home.

- **Format Selection**

The development of this learning media is carried out by compiling materials and sample questions in an interesting animation format. In the process of creating it, various editing applications, such as Canva, Capcut, and Smart Apps Creator 3, were used to produce an interactive and easy-to-understand display for students.

- **Initial Plan**

The first step in designing learning media, the process begins with opening an application that displays the title of the material in the form of text and an animation of the start button. After that, students are asked to fill in their identity, before finally being directed to the main menu available in the application.



Figure 1 App Opening View



Figure 2 App Opening View



Figure 3 Application Menu Display

The second step, which is the main stage in this learning media, includes the presentation of material, the discussion of sample questions for each topic, and the use of learning videos as a support for students' understanding.



Figure 4 Material Display

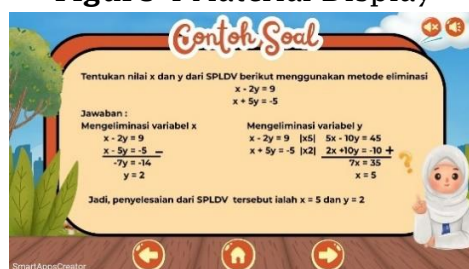


Figure 5 Example Question Display



Figure 6 Learning Video Display

The third step, which is the closing stage, the activity begins with the implementation of quiz and ends with the display of the total score as a result of the evaluation of the quiz.



Figure 7 Quiz View

3. Develop

This stage focuses on the realization process of the interactive learning media design that has been prepared in the previous stage. At this stage, concrete media creation is carried out using the Smart Apps Creator 3 application, as well as the development of multimedia components and interactivity according to the initial design. Steps at this stage include:

- **Digital Content Creation:** Materials that have been designed are developed in digital form using text, illustrative images, short learning videos, explanatory audio, and animations. Content is made engaging, contextual, and easy for learners to understand.
- **Use of Smart Apps Creator 3:** The SAC 3 platform is used to combine all multimedia elements into a single interactive learning medium. Features such as navigation buttons, transition effects, interactive quizzes, and feedback responses are added to increase learner engagement.
- **Creation of Practice and Evaluation Questions:** Multiple-choice practice questions and short fillings that can be answered directly in the media are included. Some of the questions are accompanied by interactive explanations to strengthen the understanding of concepts.

- Internal Testing (*Alpha Test*): After the media is developed, a limited trial (alpha test) is conducted to colleagues or supervisors to assess technical aspects (navigation, display, completeness of content) and provide suggestions for initial improvements.

Table 1 Assessment Criteria

	Assessment Aspects	Average Score	Category
1	Media quality aspects	3.7	Highly Valid
2	Material quality aspects	3.6	Highly Valid
3	Media layout aspects	3.7	Highly Valid
4.	Aspects of language use	3.6	Highly Valid
	TOTAL	3.7	Highly Valid

- Initial Revision: Based on the input from the initial trial, revisions were made to the media components, both in terms of technical and content. The goal is that the media is ready to be used at the implementation stage and wider trials. The result of this stage is an interactive learning media assisted by Smart Apps Creator 3 that is ready to be tested for students.
4. *Disseminate*
- Media Distribution: Learning media is distributed in the form of application files (.exe format for Windows or .apk for Android) or HTML5 versions that can be accessed through learning devices. Media files are shared with teachers and students both directly (offline) and through digital platforms such as Google Drive, WhatsApp Group, or Learning Management System (LMS) used by schools.
 - Socialization to Teachers and Schools: Media products are introduced to mathematics teachers through the Subject Teacher Deliberation forum or in internal school activities. The goal is for teachers to understand how to use media and its potential use in learning activities.
 - Submission of results and publications: The results of development and findings from product trials are published in the form of scientific articles at educational seminars or journals, in order to be a reference for other media developers and expand the impact of learning innovations.

- **User Feedback:** In this deployment process, developers also collect input from teachers and students who have used the media. The input is used as a consideration for further development in the future.

With the *dissemination* stage, the learning media developed does not only stop at the trial scale, but has the potential to be used more widely as an alternative interactive media in mathematics learning, especially in the material of two-variable linear equation systems.

The development carried out by the researcher in the form of interactive learning media assisted by Smart Apps Creator 3 (SAC) shows that this media has great potential in increasing students' interest in learning in the Two-Variable Linear Equation System material. This is supported by several important findings during the development process and limited trials. The learning media developed has interactive characteristics, attractive visuals, and navigation that is easy for students to understand. Features such as animations, interactive questions, and audio narration are able to create a more fun and less monotonous learning atmosphere.

Based on the results of the practicality test questionnaire given to students after using interactive learning media assisted by *Smart Apps Creator 3*, an average percentage of 90% was obtained. This score belongs to the "Very Practical" category, which shows that learning media is easy to use, and helps students understand SPLDV material well. Meanwhile, the results of the student learning interest questionnaire showed an average percentage of 88%, which was categorized as "Very Good". This shows that the use of interactive learning media is able to increase students' interest in learning the material of the two-variable linear equation system.

The increase in interest in learning can be seen from the positive responses of students during the trial. They showed a higher interest in the material, seemed more focused, and enthusiastic in solving the practice questions provided in the media. This is in line with the opinion Ningrum (2021) that interest in learning can grow through media that is able to stimulate students' attention and active involvement. From the teacher's side, this media is considered an innovation that supports the learning process because it makes it easier to deliver abstract material to be more concrete. The material of the two-variable linear equation system that is usually difficult to understand becomes easier to learn with the help of visualization and simulation.

These results corroborate previous research, as done by Restu Kurnia & Titin Sunaryati (2023), which states that the use of

interactive learning media can increase students' motivation and learning outcomes. In addition, the use of SAC 3 allows flexibility in developing digital media that can be used on various devices, both laptops and smartphones. However, the development of this media also faces several obstacles, such as the limitations of devices for some students and variations in the level of digital literacy. Therefore, in the future, improvements need to be made, including training for teachers and media packaging in a lighter and compatible format.

Overall, interactive learning media assisted *by Smart Apps Creator 3* has proven to be worth developing and contributes positively to increasing students' interest in learning. Further development and application on a wider scale is recommended to support more innovative and enjoyable math learning.

4. CONCLUSION AND RECOMMENDATION

Based on the results of validation by validators, learning video media is in the very valid category. In addition, from the results of observations on the implementation of learning which is in the very good category with a percentage of 89% implementation, as well as in the syntactic component, social interaction, it is concluded that the development of learning video media for a two-variable linear equation system is declared practical to be used in learning. The fulfillment of the practicality criteria is also evidenced by the positive response received from teachers of 90%, so it is in the very good category. The development of learning videos was also stated to be effective in learning. This is evidenced by the students' interest in learning at 88% and is in the very good category.

However, this study has several limitations, including the limited number of test subjects and the limitations of digital devices owned by some students. In addition, effectiveness testing is still limited to the aspect of learning interest, not including the effect on long-term learning outcomes. For further implementation, it is recommended that this media be widely used in the learning process in the classroom as well as as independent teaching materials that can be accessed through digital devices such as smartphones or computers. Steps that can be taken include: (1)

integration of media into lesson plans and daily learning activities; (2) teacher training to optimize the use of interactive features in SAC 3 (3) development of advanced versions that are compatible with various devices and platforms; and (4) the expansion of trials in other schools with a variety of student characteristics to obtain stronger generalizations of results.

Thus, it can be concluded that learning media to increase students' learning interest in the developed two-variable linear equation system material meets the level of validity, practicality, and effectiveness, and can be a solution for the implementation of innovative and interactive learning at the junior high school level, as well as being able to stimulate students' interest in learning. Thus, the learning media developed has the potential to support innovative, interactive, and adaptive mathematics learning to the needs of 21st century students.

REFERENCES

- [1] M. Sabar, N. K. Latuconsina, A. D. Angriani, Suharti, and B. Amin, "Efektivitas Model Problem Based Learning terhadap Pemahaman Konsep Matematika Peserta Didik," *Al asma J. Islam. Educ.*, vol. 5, no. 1, pp. 1-11, 2023, doi: 10.24252/asma.v5i1.37652.
- [2] F. Nur, B. Amin, N. Fatmah, A. D, and Nursalam, "Pendampingan Belajar Peserta Didik dalam Menyelesaikan Soal Tipe HOTS pada Materi Matriks," *KHIDMAH J. Pengabd. Kpd. Masy.*, vol. 4, no. 1, pp. 9-19, 2024.
- [3] Mauliana, M. Fonna, and H. Nufus, "Pengaruh Penerapan Problem Based Learning (PBL) Terhadap Keterampilan Abad 21," *Ar-Riyadhiyyat J. Pendidik. Mat.*, vol. 5, no. 1, pp. 22-30, 2024.
- [4] S. N. Maulidah *et al.*, "Analisis Peran Guru dalam Pembelajaran Abad 21 pada Siswa Sekolah Dasar di Kurikulum Merdeka," *Pop. J. Penelit. Mhs.*, vol. 3, no. 2, pp. 31-42, 2024, doi: 10.58192/populer.v3i2.2116.
- [5] Sabaruddin, "Pendidikan Indonesia dalam Menghadapi Era 4.0," *Refika Aditama*, vol. 10, no. 1, pp. 43-49, 2022.
- [6] Baharuddin *et al.*, "Implementasi Media Pembelajaran Matematika Berbasis Augmented Reality pada Materi Transformasi Geometri di SMA Insan Cendekia Syech Yusuf Gowa," *KHIDMAH J. Pengabd. Kpd. Masy.*, vol. 5, no. 1, pp. 59-70, 2025.
- [7] A. M. Nazar, D. N. Sulisawati, and N. Hidayatin, "Kemampuan Berpikir Kritis Matematis Siswa SMP Setelah Penerapan Video

-
- Edukasi dalam Proses Pembelajaran,” *Primatika J. Pendidik. Mat. dan Ris. Matematika*, vol. 7, no. 2, pp. 321–338, 2025.
- [8] Rendi, Marni, T. Neonane, and M. Lawalata, “Peran Logika Dalam Berfikir Kritis Untuk Membangun Kemampuan,” *Sinar Kasih J. Pendidik. Agama dan Filsafat*, vol. 2, no. 2, pp. 82–98, 2024.
- [9] Wahyudin, *Berpikir Logis, Kemampuan Verbal, Penalaran dan Komunikasi dalam Matematika*. 2020.
- [10] A. Maryani and W. Setiawan, “Analisis Kesulitan Peserta Didik Kelas VIII dalam Menyelesaikan Soal Sistem Persamaan Linear Dua Variabel (SPLDV) di MTs Atsauri Sindangkerta,” *J. Cendekia J. Pendidik. Mat.*, vol. 5, no. 3, pp. 2619–2627, 2021, doi: 10.31004/cendekia.v5i3.915.
- [11] F. Ahmad, M. Turmuzi, Junaidi, and Baidowi, “Analisis Kesulitan Siswa Dalam Menyelesaikan Soal Cerita Materi SPLDV Ditinjau dari Jenis Kelamin,” *J. Classroom Action Res.*, vol. 5, no. 1, pp. 128–137, 2023, doi: 10.29303/jcar.v5i1.2799.
- [12] M. S. Maria, Nurmaningsih, and R. Haryadi, “Analisis Kemampuan Representasi Matematis Siswa Pada Materi Penyajian Data,” *J. Ris. Rumpun Mat. dan Ilmu Pengetah. Alam*, vol. 1, no. 1, pp. 40–49, 2021.
- [13] Asih and A. I. Imami, “Analisis Minat Belajar Siswa SMP pada Pembelajaran Matematika,” *J. Pembelajaran Mat. Inov.*, vol. 4, no. 4, pp. 799–808, 2021, doi: 10.22460/jpmi.v4i4.799-808.
- [14] T. Wulandari, N. Hidayati, and A. Warmi, “Pengaruh Minat Belajar Matematika terhadap Kemampuan Pemahaman Matematis Siswa SMP,” *Logaritma J. Ilmu-ilmu Pendidik. dan Sains*, vol. 9, no. 02, pp. 227–238, 2022, doi: 10.24952/logaritma.v9i02.2784.
- [15] D. Ayu, S. A. Nababan, M. R. Hardiyansyah, D. Kusbiantoro, A. Azis, and A. Darma, “Pemanfaatan Media Film Sebagai Sumber Pembelajaran Sejarah dalam Upaya Meningkatkan Minat Belajar Siswa di Kelas IX IPS Madrasah Aliyah Tahfizil Qur’an,” *Hijaz J. Ilmu-Ilmu Keislaman*, vol. 2, no. 3, pp. 80–85, 2023, doi: 10.57251/hij.v2i3.1021.
- [16] M. Nur, I. Hamin, W. Wahdiah, R. Nur, and A. Rifky, “Studi Literatur : Telaah Kritis Relevansi Matematika Sekolah antara Kebutuhan Akademik dan Dunia Nyata,” *J. Ilm. Profesi Pendidik.*, vol. 10, no. 2, pp. 1201–1207, 2025.
-

- [17] M. Sudiarti, S. N. Siregar, and E. Susanto, "Pengembangan Media Pembelajaran Berbantuan Smart Apps Creator 3 pada Materi Transformasi untuk Siswa Kelas IX SMP/MTs," *J. Cendekia J. Pendidik. Mat.*, vol. 8, no. 2, pp. 899-912, 2024, doi: 10.31004/cendekia.v8i2.2135.
- [18] R. A. S. Hello, "Pengembangan Media Pembelajaran Berbasis Android Menggunakan Smart Apps Creator Pada Materi Bangun Ruang Sisi Datar di Kelas VIII SMP Negeri 2 Amabi Oefeto," *Fraktal J. Mat. Dan Pendidik. Mat.*, vol. 4, no. 2, pp. 8-20, 2023, doi: 10.35508/fractal.v4i2.13466.
- [19] Zamsiswaya, Swaluddin, and B. Sihombing, "Model Pengembangan 4D (Define , Design , Develop , dan Disseminate) dalam Pembelajaran Pendidikan Islam," *J. Islam. El Madani*, vol. 4, no. 1, pp. 11-19, 2024.
- [20] D. Lawhon, "Instructional development for training teachers of exceptional children: A sourcebook," *J. Sch. Psychol.*, vol. 14, no. 1, p. 75, 1976, doi: 10.1016/0022-4405(76)90066-2.
- [21] C. C. Ningrum, "Pengaruh Penggunaan Media Pembelajaran Terhadap Minat Belajar dan Hasil Belajar Siswa di Kaliputih," *Pharmacogn. Mag.*, vol. 75, no. 17, pp. 399-405, 2021.
- [22] I. Restu Kurnia and Titin Sunaryati, "Media Pembelajaran Video Berbasis Aplikasi Canva Untuk Meningkatkan Minat Belajar Siswa," *J. Educ. FKIP UNMA*, vol. 9, no. 3, pp. 1357-1363, 2023, doi: 10.31949/educatio.v9i3.5579.