JOURNAL OF APPLIED SCIENCE AND ENGINEERING MANAGEMENT RESEARCH
Volume 1, Number 3 (August 2025):170-180
E-ISSN: 3089-5529, https://jasemresearch.com

Research Article

Development of Math Interactive Applications for Elementary Schools Using Adobe Animate

Ariesta Wulandari Ciptaningtyas[1*], Setiyono[2], Bagus Ramadhan Setyo Nugroho[3]

[1,2] Sekolah Tinggi Teknik Malang, Indonesia

[*]corresponding author: ariestaciptaningtyas@gmail.com

Article history:
Received June 26, 2025
Revised July 12, 2025
Accepted July 15, 2025

Keywords:
adobe animate;
media pembelajaran interaktif;
mathematics; learning process;
elementary schools

Abstract

This research aims to develop an interactive application of mathematics for elementary schools using Adobe Animate. The data collection in this study is in the form of information related to learning media and how to make interactive learning media applications using Adobe Animate. The instrument in this study is a questionnaire containing written statements addressed to Media Experts and Subject Matter Experts to test the feasibility of research on the development of interactive applications for mathematics for elementary schools using Adobe Animate. The results of the research on the development of interactive mathematics applications for elementary schools using Adobe Animate were concluded that the creation of interactive learning media using Adobe Animate is very feasible and can be used in the learning process in elementary schools.

To cite this article: Ciptaningtyas, A.W., Setiyono, Nugroho, B.R.S. 2025. Development of Math Interactive Applications for Elementary Schools Using Adobe Animate. Journal of Applied Science and Engineering Management Research 1(3):170-180.

Introduction

Mathematics education at the elementary school level plays an important role in shaping the foundation of mathematical knowledge for students. However, conventional approaches in teaching mathematics are often limited in building interest and understanding in students. In delivering material, educators are faced with two main things, namely classroom management where educators must be able to create a conducive atmosphere in the learning process and by carrying out learning activities in a controlled and directed manner (Firmansyah, et al., 2020). The use of computer information technology can be used by educators to support students in learning which can increase motivation, student learning outcomes and make the learning atmosphere more enjoyable (Tüzün, in Arisanti & Adnan, 2021).

As one of the important materials in mathematics, the introduction of diagrams needs to be learned at the school level. In the diagram introduction material, students will be introduced to diagrams and also how to group data using tables, which are used to represent data visually. Diagram introduction materials have a significant role in helping learners understand the basic concepts of statistics and data analysis. By studying diagrams, students can learn how to present and analyze information visually, so that students can develop important data interpretation skills in daily life (Septiawan, 2023).

In the process of teaching to know diagrams, educators need to find an approach that is in accordance with the level of understanding and interest of students at the elementary school level. In order for learning to attract more students' attention, educators can also provide interactive learning media. The use of interactive learning media, such as animation and simulation, can provide a more dynamic and engaging learning experience for students (Cahyani, et al., 2023). Through interactive learning media, students can be actively involved in using interactive learning media to get to know

diagrams better, so as to strengthen students' understanding of visual representation of data.

One of the uses of technology that can be applied to learning and teaching activities to make it more interesting is by using interactive application media. The learning process becomes more interesting with interactive learning media that combines displays with various image and animation features (Kuswanto & Radiansah, in Habib, et al., 2020). Interactive app media offers a dynamic and engaging approach to learning by combining visual, audio, and interactive elements in a single platform. Using technologies such as *Adobe Flash* or what is now called *Adobe Animate*, interactive applications can be designed to present math learning materials in a more engaging and easy-to-understand way for learners.

Adobe Animate can combine interesting images, audio, and video (Miaz, et al., in Yunarti, et al., 2022). The development of learning media using *Adobe Animate* has the advantage that developers can manage the elements used and adjust them to the learning needs and preferences of students. Thus, developers can easily integrate various multimedia elements to create a more enjoyable and meaningful learning experience for learners. Not only providing experience for students, educators also gain experience in using interactive application media as a tool to plan and carry out more interesting and effective lessons (Lestari, et al., 2023).

Through interactive learning media, students can be invited to explore and actively discover mathematical concepts through exploration, experimentation, and problem-solving. This not only helps deepen students' understanding of mathematical concepts, but also helps them develop critical and creative thinking skills. Interactive application media can make students more interested and motivated to attend learning and teaching activities. With motivation, students will be more enthusiastic in the process of learning and teaching activities at school and can make these learning and teaching activities more exciting (Nizaar, et al., 2022).

Learning Media

According to Daulae (2019), learning media is a tool in the teaching and learning process is everything that can be used to stimulate thoughts, feelings, attention, and learning abilities or skills, so that it can encourage the learning process. Meanwhile, according to Haryadi and Kansaa (2021), learning media is a tool used to convey information from trusted sources, where educators inform students of material to facilitate the learning process. In addition, there are several reasons related to the use of learning media, including: lessons will attract more students' attention, learning materials will be easier for students to understand, teaching methods will be more varied, and students will be more active in the learning process. The use of learning media can also improve the quality of the teaching process and results.

According to Faqih (2020), learning media is a tool or tool used by educators in teaching and learning activities. Educators are also expected to create effective, innovative, and interesting media, so that students are interested in participating in the learning that is delivered. Meanwhile, according to Haidir, et al. (2021), learning media includes all tools and materials that can be used to achieve educational goals, such as radio, television, books, newspapers, magazines, and so on. The use of e-learning learning media presents new innovations, where students not only listen to material from educators, but can also see, hear, and do activities related to the material.

Based on the above understanding, it can be concluded that learning media tools or devices used in the teaching and learning process are to stimulate students' thoughts, feelings, attention, and learning abilities or skills. This media serves to convey information, so that learning materials can be delivered effectively and easily understood by students.

Types of Learning Media

Types of learning media can be categorized based on the interactions that occur during the learning process. This division includes various methods and tools used to deliver material to students. The type of learning media is divided into two categories, namely learning media based on one-way communication and learning media based on two-way communication.

One-way learning is a learning process where teachers play a more active role in delivering subject matter. The one-way learning model is also

considered abstract and theoretical learning, causing some students to be unable to connect the material that has been learned with how the material or knowledge is used in life (Sumiati & Asra in Indriani, et al., 2021). Two-way learning is a learning method that involves mutual interaction between teachers and students. In this method, both parties fill in each other, share information, and exchange opinions, known as "*take and give*" (choiri, et al., 2023).

Interactive Learning Media

According to Saraswati and Novallyan in Fernando (2022), interactive learning media is a tool to convey messages from educators to students, enable communication between humans and technology through application-based systems and infrastructure, and use electronic media as an educational method. With interactive learning media, the learning process can be done anywhere and anytime.

According to Prior and Kirschner in Yanto (2019), learning media is a form of learning media that in its use creates a relationship between the user and the media, allowing for a reciprocal influence as well as actions and reactions between the two in helping to convey learning materials. Interactive learning media can help the learning process so that the meaning of the message conveyed becomes clearer and educational goals can be achieved effectively and efficiently (Afifah, et al., 2022). With this media, students can more easily understand the material because it is presented in an interesting and interactive manner.

Indicators of interactive learning media include several important aspects that must be considered. First, the material aspect that ensures that the content presented is relevant, accurate, and in accordance with the curriculum. Second, the language aspect that prioritizes the use of language that is easy to understand, precise, and in accordance with the level of understanding of students. Third, the aspect of presentation that emphasizes the way of delivering material that is interesting, systematic, and easy to follow. Fourth, the visual aspect of the display that demands an attractive, clear, and supportive view of the material. Fifth, the learning design aspect that ensures that the media is well-designed, interactive, and able to facilitate the learning process effectively (Lestari, et al., 2023).

Based on the above understanding, it can be concluded that learning media is a tool and method used to convey material from educators to students with the aim of facilitating the teaching and learning process. The use of interactive learning media can arouse new interests and increase students' motivation to learn.

Application

An application is software that is designed to perform a specific task or provide specific functions for the user. According to Elisa, an application is software consisting of code or instructions that can be modified as needed (Syani and Werstantia in Setiawan and Nita., 2019). Hengky argues that applications are software designed to meet various computerization needs carried out by users (Yuntari in Setiawan and Nita., 2019). Meanwhile, according to Wijaya, et al, an application is a program that is ready to be used, designed to carry out the commands of its users, with the aim of producing more accurate results in accordance with the purpose of making the application (Parina, et al., 2022).

Based on the above definition, it can be concluded that an application is a software that is designed to perform certain tasks and provide specific functions for users. By containing code or instructions that can be modified as needed, applications meet various computerization needs by executing commands from their users.

Stages of Creating Interactive Learning Media Applications

The development of interactive learning media applications is carried out through six systematic stages to ensure optimal results. The six stages consist of: 1) *Concept* . 2) *Design* . 3) *Material collecting* . 4) *Assembly* . 5) *Testing* . 6) *Distribution* (Devega, et al., 2022).

1. *Concept*

At this stage, the primary purpose of the application is established, and the targeted audience or user is clearly identified. This identification will determine the direction of application development to suit the needs and characteristics of users (Devega, et al., 2022).

2. *Design*

At the *Design* stage, the main focus is to design materials, create *storyboards* and create *UML (Unified Modelling Language)* which serves as a guide for developing applications

3. *Material Collecting*

At this stage, the materials needed to make the application are carefully collected. This process produces learning materials and supporting images that will be used in interactive learning media (Devega, et al., 2022).

4. *Assembly* (manufacture)

At this stage, the design of the learning media display is carried out according to the storyboard that has been made. This process involves selecting visual elements and curating content to ensure that the material can be easily understood by learners (Devega, et al., 2022).

5. *Testing*

The testing stage is carried out after the learning media is finished to ensure that everything is of quality and effectiveness. At this stage, the application that has been developed will be checked first for errors or shortcomings (Devega, et al., 2022).

6. *Distribution* (pendistribusian)

At this stage, the application will be stored in a storage medium. Because this application will later be changed to an APK version so that users will install the application. This stage can also be called the evaluation stage for the development of finished products to be better (Devega, et al., 2022).

Adobe Animate

Adobe Animate is one of the programs available on computers. By using *Adobe Animate*, users can create and display various elements such as images, text, animations, sounds, videos, and interactive content (Amin, et al., 2021). *Adobe Animate* is an application for creating moving animations that can be used to develop more interesting learning media and motivate the spirit of learning. As a multimedia tool from *Adobe Systems*, *Adobe Animate* allows for effective animation creation for various needs (Riskawati, et al., 2021).

According to Mustaqim and Apriyanto, *Adobe Animate* is a program specially developed by *Adobe*, becoming a standard application for professional development. This program is used to create attractive bitmap animations and graphics, as well as to design interactive and dynamic websites (Samsudin, et al., 2019). *Adobe Animate* is a development of *the Adobe Flash* application and belongs to the multimedia category. The app is designed to create vector graphics-based animations (Hendrick, et al., 2024).

The Adobe Animate *indicator* covers several important aspects that need to be considered in the development of interactive learning media. First, the visual display aspect requires an attractive design that is easy to understand by users, so that it can optimally support the learning process. Secondly, the menu aspect should be designed intuitively and easily accessible, allowing users to navigate the app smoothly and find the information they need without any difficulty. Third, the writing aspect prioritizes the use of text that is clear, easy to read, and in accordance with the level of understanding of the target user, so that the message conveyed can be well received. Fourth, the application aspect ensures that all media elements work in harmony, providing an effective and efficient learning experience for students (Setiawan, et al., 2022).

Based on the above understanding, it can be concluded that *Adobe Animate* is a multimedia application developed by *Adobe Systems*, designed for the creation of moving animations and interactive content. *Formerly* known as *Adobe Flash Professional*, *Macromedia Flash*, and *Futuresplash Animator*, *Adobe Animate* supports the creation of HTML5-based animations, vector graphics, and multimedia content for a variety of applications such as learning media, web, and advertising.

Math

The purpose of learning mathematics in schools is to ensure that students have good thinking skills in solving mathematical problems (Rosnawati in Marfu'ah, et al., 2022). According to Alhaddad, mathematics is a science that focuses on logical thinking and systematic reasoning. However, mathematics learning is often less preferred by students, who consider it as material that only contains memorization of formulas. This is one of the

reasons why many students do not like mathematics and consider it a difficult subject (Anti, et al., in Fahma and Purwaningrum., 2021).

Mathematics has many applications in everyday life, such as in buying and selling transactions and others. Ojose stated that to increase children's interest in learning mathematics, the process can begin with the introduction of numbers by parents (Fahma and Purwaningrum., 2021). Mathematics is important to be given to students in order to develop logical, systematic, critical, and creative thinking skills analytically, as well as the ability to work together (Hatip and Setiawan., 2021).

Based on the above understanding, it can be concluded that mathematics is a science that focuses on logical thinking and systematic reasoning, with the main goal that students can develop good thinking skills in solving mathematical problems. Although it is often considered difficult and contains only memorization of formulas, mathematics can be applied in everyday life.

Materials and Methods

The type of data in this study is a type of quantitative descriptive data to test the feasibility of interactive learning media applications obtained from the results of questionnaires conducted by media experts and material experts.

In the study entitled "Development of Interactive Mathematics Applications for Elementary Schools Using *Adobe Animate*", the researcher chose the type of R&D (*Research and Development*) method where *the research* in this study is by collecting data. Meanwhile, the *development* in this study is the development of an interactive mathematics application for elementary schools using *Adobe Animate*.

Results and Discussion

After going through various processes starting from the creation of the concept to the distribution stage in this study, then an analysis of the results of data collection in the form of information is carried out to determine the feasibility results of this research.

The first results were obtained from a questionnaire that had been tested for validity by media experts. The media member who was chosen to give a score in this study was named Rafsanjaya S.Pd. Rafsanjaya S.Pd is a teacher majoring in DKV from State Vocational Secondary School 4 Malang. The validity test was carried out on December 27, 2024 with the following results:

Table 1. Media Expert Questionnaire Results

No	Indicator	Statement	Answer				
			SS	S	KS	TS	STS
1	Visual Display	The visual display is consistent and in harmony with the learning material.		✓			
		Visual displays can make it easier for users to understand the content presented.		✓			
		The color combination used creates a good contrast and is easy to see.		✓			
2	Menu	The navigation menu on this media is easily accessible to users.	✓				
		The naming of menus in this app is clear and in accordance with its function.	✓				
		The menu arrangement is well structured, so it doesn't confuse users.		✓			
3	Writing	The writing used is of the appropriate size and easy to read.	✓				
		The writing style used is consistent and does not confuse the user.		✓			
		The use of language is appropriate and appropriate to the user's level of understanding		✓			

No	Indicator	Statement	Answer				
			SS	S	KS	TS	STS
4	Application	The app runs smoothly without experiencing significant technical glitches during use.	✓				
		The features provided can be functional and relevant to learning needs		✓			
		The app has a fast response time and doesn't experience lag when used.		✓			

Source: Personal Data, 2024

Based on the results of the questionnaire assessment conducted by media experts, the percentage of the score was obtained using the following likert scale formula:

$$p = \frac{Nilai\ Total\ (nt)}{Skor\ Diharapkan\ (s)} \times 100\%$$

$$p = \frac{52}{60} \times 100\%$$

$$p = 86\%$$

Keterangan :

- Sangat Setuju : 4 x 5 = 20
- Setuju : 8 x 4 = 32
- Nilai Total : 52
- Skor Diharapkan : 60

The respondents' answers from the media experts can be analyzed based on the opinions of several experts in previous research. The results of the analysis obtained are as follows:

1. ***Visual Display***

Based on the assessment obtained from media experts, some visual appearance or design of learning media applications can be rearranged to make it even better. Meanwhile, the visual appearance already looks consistent and easy to understand. As explained by Saniriati, et al. in Maielfi, et al., (2023), *Adobe Animate* provides various features that support the creation of learning media, such as writing, animation, video, voice, and user interactivity, which makes it easier for developers to visualize learning materials.

2. Menu

The importance of ease of access and navigation of menus in interactive learning media applications. This is in accordance with the indicator statement by Setiawan, et al., (2022), secondly, the aspect of the menu must be designed intuitively and easily accessible, allowing users to navigate the application smoothly and find the information they need without difficulty.

3. Writing

The importance of a clear, consistent, and appropriate text design to the user's level of understanding to ensure whether the message in the learning medium can be easily accepted by the user. This is in accordance with the indicator statement by Setiawan, et al. (2022), third, the aspect of writing that prioritizes the use of clear, easy-to-read text, and in accordance with the level of understanding of the target user, so that the message conveyed can be well received.

- Good text elements, such as size, font, and language, can help convey the meaning of the message clearly and efficiently in interactive learning media applications. This is in accordance with the statement made by Afifah, et al, (2022), interactive learning media can help the learning process so that the meaning of the message conveyed becomes clearer and educational goals can be achieved effectively and efficiently.

4. Application

5. Interactive learning media applications must have good performance, relevant features, and fast response to create an optimal learning experience for users. This is in accordance with the indicator statement by Setiawan, et al. (2022), fourth, the application aspect ensures that all media elements work in harmony, providing an effective and efficient learning experience for students.

Applications must be able to fulfill their purpose, perform their functions smoothly, and provide an optimal experience for users. This is in accordance with the statement made by Wijaya, et al, in Parina, et al, (2022), an application is a ready-to-use program, designed to carry out the commands of its users, with the aim of producing more accurate results in accordance with the purpose of creating the application.

Furthermore, analysis by material experts. The subject matter expert who was chosen to provide grades in this study was named Nadilla Luthfi Kurniasari S.Pd. Nadilla Luthfi Kurniasari S.Pd is a mathematics teacher at Qurrota A'yun Plus Elementary School. The validity test was carried out on January 2, 2025 with the following results:

Table 2. Media Expert Questionnaire Results

No	Indicator	Statement	Answer				
			SS	S	KS	TS	STS
1	Material	The material presented in this application is relevant to the curriculum and learning needs of students.		✓			
		The material in this application covers all the important concepts that learners need to understand.	✓				
		The materials presented follow the latest developments in the relevant field		✓			
2	Language	The language used is easy for students to understand.		✓			
		The use of grammar and spelling in the material in accordance with the applicable language rules	✓				
		The language used is consistent and does not confuse students		✓			
3	Presentation	The material is presented systematically and follows a logical flow that facilitates understanding.		✓			
		The presentation of material is interesting and can retain the attention of students.			✓		
		The information presented is well organized and does not confuse students		✓			
4	Visual Display	The visual display supports the understanding of the material and does not confuse students.	✓				
		The images and graphics used are clear and of high quality	✓				
		Visual display is consistent with the themes and materials presented	✓				

Source: Personal Data, 2024

Based on the results of the questionnaire assessment conducted by media experts, the percentage of the score was obtained using the following likert scale formula:

$$p = \frac{Nilai\ Total\ (nt)}{Skor\ Diharapkan\ (s)} \times 100\%$$

$$p = \frac{52}{60} \times 100\%$$

$$p = 86\%$$

Keterangan :

- Sangat Setuju : 5 x 5 = 25
- Setuju : 6 x 4 = 24
- Kurang Setuju : 1 x 3 = 3
- Nilai Total : 52
- Skor Diharapkan : 60

The respondents' answers from the subject matter experts can be analyzed based on the opinions of several experts in previous research. The results of the analysis obtained are as follows:

1. Material

Learning media must be able to convey relevant and appropriate information, which can facilitate the learning process for users according to the material studied. This is in accordance with the statement made by Haryadi and Kansaa (2021), learning media is a tool used to convey information from trusted sources, where educators inform students of the material to facilitate the learning process.

- This is also in accordance with the indicator statement by Lestari, et al., (2023), first, the material aspect that ensures that the content presented is relevant, accurate, and in accordance with the curriculum.

2. Language

The use of clear, correct, and consistent language in interactive learning media applications must be in accordance with the user's understanding. This is in accordance with the indicator statement by Lestari, et al., (2023), second, language aspects that prioritize the use of language that is easy to understand, appropriate, and in accordance with the level of understanding of students.

3. Presentation

Based on the assessment obtained from material experts, *the background sound* used in interactive learning media applications needs to be reconsidered because it is still not in accordance with the characteristics of grade 1 elementary school children. Meanwhile, the material has been presented logically and structured, by maintaining the user's attention with the application of learning media, the learning process can be more effective. This is in accordance with the indicator statement by Lestari, et al, (2023), third, the aspect of presentation that emphasizes the way of delivering material that is interesting, systematic, and easy to follow.

The presentation of systematic and interesting material will increase user engagement and make it easier for users to understand the material being studied. This is in accordance with the statement made by Afifah, et al, (2022), students can more easily understand the material because it is presented in an interesting and interactive manner, allowing them to actively participate in learning.

4. Visual Display

A good visual display must have clarity, quality, and consistency to support the understanding of the material being presented. This is in accordance with the indicator statement by Lestari, et al, (2023), fourth, the visual appearance aspect that demands an attractive, clear, and supportive view of the material.

The importance of choosing the right visual elements that are precise, consistent and structured will make it easier for the user to understand the material. This is in accordance with the statement made by Devega, et al, (2022), this process involves the selection of visual elements and the preparation of content to ensure that the material can be easily understood by students.

Conclusion

Based on the results of research from the development of mathematics interactive learning media applications for elementary schools using *Adobe Animate*, it was concluded that the use of *Adobe Animate* in the creation of interactive learning media applications is very feasible and can be implemented in the learning process in elementary schools. This can be proven through the results of the feasibility test conducted by media experts with a percentage result of 86% and material experts with a percentage result of 86%. So that the use of *Adobe Animate software* in the process of creating interactive media applications can make it easier for a developer to develop the desired interactive learning media application.

References

Afifah, N., Kurniaman, O., & Noviana, E., (2022). Development of Interactive Learning Media in Indonesian Language Learning Class III Elementary School. Journal of Educational Progress, Vol. 1, No. 1, p. 33–42.

Alvendri, D., Huda, Y., & Darni, R. (2023). Design of mobile basic concept interactive learning media using the Android-based Unity application. Journal on Education, Vol. 5, No. 4, p. 11062-11076.

Amin, F. I., Sri, S., & Somakim. (2021). Development of Interactive Media on Spatial Building Materials Using Adobe Animate in Class V. Journal of Elementary Schools: A Study of Educational Theory and Practice, Vol. 30, No. 2, p. 147-158.

Arisanti, Y., & M. Fachri, A. (2021). Development of Interactive Multimedia Based on Macromedia Flash 8 Software to Improve Motivation and Learning Outcomes of Elementary School Students. BASICEDU Journal, Vol. 5, No. 4, p. 2122-2132.

Audhiha, M., et al., (2022). Development of Interactive Multimedia Based on Adobe Animate CC on Building Materials for Elementary School Rooms/ Madrasah Ibtidaiyah. Journal of Basicedu, Vol. 6, No. 1, p. 1086–1097.

Cahyani, A. N., Lintang, K., & Diana, E. (2023). Improvement of Mathematics Learning Outcomes through the Use of Diagram Board Media in Grade V Elementary School Students. Didactic: PGSD Scientific Journal, Vol. 09, No. 04, p. 915-925.

Chen, R. (2016). Adobe Animate CC Classroom in a Book (2017 release). san francisco: Adobe Press.

Choiri, M. M., Rokhim, A., & Cindarbumi, F. (2023). Strategies to build two-way communication between teachers and students in online learning at MTs. Al-Rosyid Dander Bojonegoro. Journal of Discovery, Vol. 8, No. 2, pp. 63-68.

Daulae, H. T. (2019). Steps for the Development of Learning Media Towards Improving the Quality of Learning. Journal of Paediatric Forum, Vol. 10, No. 1, p. 52-63.

Devega., et al. (2022). Android-based Human Circulatory System Interactive Learning Media Application in Elementary School. Journal of Electrical and Vocational Engineering, Vol. 8, No. 1, P. 117-127.

Elis., & Voutama, A. (2023). The Utilization of Uml (Unified Modeling Language) in Planning a Website-Based Traditional Clothing Rental System. INFORMATICS: Journal of Informatics, Management and Computers, Vol. 14, No. 2, P. 26-35.

Fahma, M. A., & Purwaningrum, J. P. (2021). Piaget's Theory in Mathematical Learning. MUST: Journal of Mathematics Education, Science and Technology, Vol. 6, No. 1, p. 31–42.

Faqih, M., (2020). Effectiveness of Using Android-Based Mobile Learning Media. KONFIKS: Journal of Language, Literature & Teaching, Vol. 7, No. 2, p. 27-34.

Fernando, J. (2022). Android-based interactive volleyball learning media. Indonesian Journal of Sports and Health (JOKI), Vol. 2, No. 2, p. 94-99.

Firmansyah, H. F., Sekar; N. F. A., & Elsya, R. D. (2020). Development of Interactive Learning Multimedia for Mathematics Subjects for Grade 5 Elementary School. Journal of Multimedia Education, Vol. 2, No. 2, p. 101–110.

Green, T., & Labrecque, J. (2017). Beginning Adobe Animate CC: Learn to Efficiently Create and Deploy Animated and Interactive Content. New York: Apress Media.

Gulo, S., & Harefa, A. O. (2022). Development of Powerpoint-Based Interactive Learning Media. EDUCATIVO: Journal of Education, Vol. 1, No. 1, p. 291-299.

Habib, A., I Made, A., & Erry, U. (2020). 21st Century Learning Media: The Need for Interactive Multimedia for Elementary School Teachers and Students. Journal of Educational Technology and Innovation Research, Vol 3, No. 1, P. 25-35.

Haidir, M., Farkha, F., & Mulhayatiah, D. (2021). Analysis of the Influence of Video-Based Learning Media on Physics Learning. Journal of Physics Education, Vol. 9, No. 1, p. 81-89.

Haryadi, R., & Hanifa, N. A. K. (2021). The Influence of E-Learning Learning Media on Student Learning Outcomes. At-Ta'lim: Journal of Education, Vol. 7, No. 1, p. 68-73.

Hatip, A., & Setiawan, W. (2021). Bruner's cognitive theory in mathematics learning. PHI: Journal of Mathematics Education, Vol. 5, No. 2, p. 87-97.

Hendrick, Z. T., et al., (2024). Analysis of the Needs of Adobe Animate-Based Interactive Digital Animation Media in Elementary Science Lessons. Scientific Journal of the Education Profession, Vol. 9, No. 2, p. 1371–1377.

Indriani, N., Aisyah, A. N., & Elok, F. N., (2021). One-way learning makes learning math meaningless. Journal of Educational Charities, Vol. 2, No. 3, p. 192-202.

Khilda N, & Lisna S., (2022). Unified Modelling Language (UML) for the Design of New Student Admission Information System at Smk Marga Insan Kamil. J-SIKA|Journal of Information Systems by Anak Bangsa, Vol. 4, No. 1, p. 17–23.

Lestari, T. A., Bq. Sri, H., & Eni, S. (2023). Development of Adobe Animate-Based Learning Media for High School Students in Class X in Mataram City. Journal of Imliah Education Profession, Vol 8, No. 4, p. 2012-2018.

Maielfi, D., Wahyuni, S., & Nurpatri, Y. (2023). Analyze the needs of interactive media development using Adobe Animate. Biormatics : Scientific Journal of the Faculty of Teacher Training and Education, Vol. 9,

No. 1, p. 1–8.

Marfu'ah, S., et al., (2022). Mathematics Learning Model to Improve Students' Mathematical Reasoning Skills. PRISMA, Proceedings of the National Seminar on Mathematics, Vol. 5, p. 50-54.

Nafala, N. M. (2022). Implementation of comic media in learning to increase students' motivation to learn. AL-FIKRU, Journal of Education and Science, Vol. 3, No. 1, p.114-130.

Nufriansyah, A., Irzal, M., & Arafiah, R. (2023). Design of a Website-Based Field Work Practice Information System. J-KOMA: Journal of Computer Science and Applications, Vol. 1, No. 1, P. 53-60.

Parina, R., Wijaya, A., & Apridiansyah, Y. (2022). Chatbot application as an interactive learning medium for SD N 17 Bengkulu City based on Android. INFOTAMA MEDIA JOURNAL, Vol. 18, No. 1, p. 121-127.

Pradana, A. G., & Nita, S., (2019). Design and Build Educational Game "AMUDRA" Android-based Regional Musical Instruments. Journal of the National Seminar on Information and Communication Technology, Vol. 2, No. 1, p. 49-53.

Prihatiningtyas, T. W., Harmastuti., & Herawati, N. . (2023). Designing an Android-Based Traditional Culinary Tourism Information System In The Si Cangkring Valley, Banyurejo: Designing an Android-Based Old School Culinary Tourism Information System in Si Cangkring Banyurejo Valley. Journal of Technoscientia Technology, Vol. 16, No. 1, p. 41–51.

Qusyairi, L. A. H., (2019). Creation of Physics Learning Media Based on Macromedia Flash. Islamika, Vol. 1, No. 1, p. 97-114.

Rahmawati, N. S., et al., (2023). Feasibility Test of Animation-Based Learning Media Using Adobe Animate on Climate Change Materials. Natural Science Education Research (NSER), Vol. 6, No. 2, p. 11-19.

Riskawati., Tjandi, Y., & Mappease, M. Y. (2024). Development of Interactive Learning Media Using Adobe Animate for Dyslexic Children at SMPN 2 North Polongbangkeng Takalar Regency. MediaTIK Journal, Vol. 4, No. 2, p. 17–20.

Rosidah., et al. (2022). The Effectiveness of Powerpoint-Based Interactive Game Learning Media to Increase the Learning Motivation of Grade V Elementary School Students. Journal of the National Seminar of Paedagoria, Vol.2, p. 10-16.

Samsudin., Irawan, M. D., & Harahap, A. H. (2019). Multimedia-based human indigestion education mobile app using Adobe Animate CC. (JurTI) Journal of Information Technology, Vol. 3, No. 2, p. 141-148.

Septiawan, R. D., Lilik, S., & Sri, W. (2023). Design of Mathematics Mobile-Based Learning Media Introduction Material for Elementary School Level Diagrams for Grade 1. Journal of Information Systems Research, Vol. 1, No. 4, p. 12-21.

Setiawan, A., Okta, A., & Puji, A. (2022). Development of Interactive Multimedia Using Adobe Animate Software on the Material of Sequences and Series For Class XI MAN Bintan. Jurnal Gantang, Vol. 8, No. 1, Hal. 29-38.

Setiawan, R. R., & Nita, S., (2019). Designing an Android-based Qur'an Edu Learning Application. Journal of the National Seminar on Information and Communication Technology, Vol. 2, No. 1, p. 225-228.

Silvia & Imam, B. (2021). Mobile Learning Development Using Adobe Animate CC to Improve Student Motivation and Learning Outcomes. ECODUCATION: Journal of Economics and Education, Vol. 3, No. 1, P. 110-124.

Sumiati, M., Abdillah, R., & Cahyo, A. (2021). Uml Modeling for Party Equipment Rental Information System. Fasilkom Journal, Vol. 11, No. 2, p. 79-86.

Supriadi., et al., (2023). The Use of React Native in the Development of Computer Assembly Interactive Learning Media Applications to Improve Student Learning Achievement.JTePen : Journal of Technology in Education, Vol. 1, No. 1, P.

4–8.

Tashildar, A., Shah, N., Gala, R., Giri, T., & Chavhan, P. (2020). Application development using flutter. International Research Journal of Modernization in Engineering Technology and Science, Vol. 2, No. 8, Hal. 1262-1266.

Utomo, F. T. S. (2023). Interactive Learning Media Innovation to Increase the Effectiveness of Digital Era Learning in Elementary Schools. Pendas: Scientific Journal of Basic Education, Vol. 8, No. 2, p. 3635-3645.

Wijaya, R. F. (2022). Android-based Interactive Learning Media Creation Textbook with Adobe Flash Professional CS 6 . Publisher of Tahta Media.

Yanto, D. T. P., (2019). Practicality of Interactive Learning Media in the Learning Process of Electrical Circuits. INVOTEK: Journal of Vocational Innovation and Technology, Vol. 19, No. 1, P. 75-82

Yunarti, Y., Selvi, L., & Amalia S. (2022). Development of Interactive Mathematics Learning Media Based on Adobe Flash Cs6. AXIOM: Journal of the Mathematics Education Study Program, Vol. 11, No. 1, Pages 159-170.

166.doi:10.21511/imfi.16(1).2019.12

Kojo Oseifuah, E. (2010). *Financial literacy and youth entrepreneurship in South Africa*. African Journal of Economic and Management Studies,1(2),164_182.https://doi.org/10.1108/20400701011073473

Krishna, A., Rofaida, R., & Sari, M. (2010). *Analysis of the Level of Financial Literacy among Students and the Factors That Apply It.* Proceedings of the 4th International Conference on Teacher Education; Join Cconference UPI & UPSI Bandung, Indonesia

Kriyantono, Rachmat. 2012. *Practical Techniques of Communication Research*. Jakarta: Kencana.

Kumar, Nitin.2013. "*financial inclusion and its determinants: Evidence fromindia"*. journal of financial economic policy. vol. 5 No 1. Emerald Group Publishing

Kusuma, I Nyoman Patra, 2020. Application *of Financial Literacy to Financial Inclusion through Financial Technology in MSMEs in Bandar Lampung.* Vol. 4 No. 5. Journal of Business Management and Entrepreneurship : 247-252

Lokhande, Madhavi A.2011. "*Financial Inclusion : Options for Micro, Small andMedium Enterprises" Synergy*