

Development of Articulate Storyline-Based Learning Media in Differentiated Learning of Merdeka Curriculum in Elementary Schools

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Abstract

Differentiated learning does not differentiate the learning treatment of students, but rather understands the strengths and weaknesses, as well as the learning needs of students according to their own learning styles. One of the efforts made to overcome this problem is to use articulate storyline learning media. The media products developed have complete features and are able to serve the diversity of student learning styles, namely having an attractive appearance, there are instructions for use, there are interactive learning materials (text, images, animations and videos), there is the development of student worksheets and has innovative learning evaluation features. The research method used is development research with the ADDIE model, the collection techniques used are observation, interviews, pre-test and post-test, paired sample t-test data analysis techniques. The research sample consisted of 31 fourth-grade students of Kaduagung State Elementary School. The results of the study of learning media based on Articulate Storyline in the material aspect obtained a very valid assessment of 92%, and the media aspect obtained a very valid assessment of 95%. The feasibility and practicality aspects were 90% by the supervising teacher and 87% by the students. The effectiveness test of the Paired Samples T Test obtained a value of ($0.000 < 0.05$), which means there is a significant influence, so it is concluded that there is a significant influence of the use of articulate storyline-based learning media on differentiated merdeka curriculum learning at Kaduagung State Elementary School.

Keywords: Differentiated learning; Articulate Storyline; Merdeka Curriculum.

INTRODUCTION

Currently, the merdeka curriculum has been implemented gradually in all elementary schools in Indonesia (Fransiska et al., 2023) (Pratiwi et al., 2023). The role of teachers in the merdeka curriculum is to facilitate students in obtaining the knowledge and skills needed to become independent and creative individuals (Mukhibat, 2023) (Kusumawati et al., 2021). In the merdeka curriculum, learning is carried out by paying attention to the heterogeneous characteristics of students (Dwiputra et al., 2023). Among the flagship programs of the merdeka curriculum are the Pancasila student profile strengthening project (P5) and differentiated learning, namely that Indonesian students must have the standard character of Pancasila students and differentiated learning, namely learning that adapts to the needs or learning styles of students.

Differentiated learning is learning that adapts to students' interests and learning styles, to improve learning outcomes (Aguanda et al., 2023). The purpose of differentiated learning is not to differentiate the learning treatment of students, but rather to understand the strengths and weaknesses, as well as the learning needs of students.

Every student has their own learning style and that is what differentiates one student from another (Yusuf & Erviana, 2022). Therefore, carrying out differentiated learning is very important because students learn and understand learning materials according to their own learning style (Malacapay, 2019).

One of the efforts made to overcome this problem is to use interesting learning media. One of the effort that can be made to overcome these problems is by using interesting learning media (Agung Ayu Komang Mia Anjali et al., 2023). The learning media in question is learning media that can serve different learning styles of students. Three learning styles of students are visual, auditory and kinesthetic. So the learning media used must have an attractive appearance, there are learning videos and facilitate students to do learning (kinesthetic) with the availability of student worksheets and there are interesting learning evaluations.

Learning media has an important role in the learning process and is able to increase students' interest in learning (Ntobuo et al., 2018). The use of interesting learning media can help students understand learning materials (Hanif et al., 2023). However, in reality, there are still many learning activities that do not utilize learning media properly (Septinaningrum et al., 2022), The use of interesting learning media can help students understand learning materials.

Articulate storyline is an application that can create interesting learning media, not only can it help students actively ask questions, pay attention to teachers, make presentations, speak, actively use media, utilize media and be active in implementing student worksheets (Nursalam et al., 2023). The articulate storyline learning media has several advantages, namely having a feature for adding characters, various quizzes/evaluations, link question forms and URL buttons, object separator screens from each other, and triggers that function to direct to the desired slide. And can be saved in several formats such as LMS, html5, articulate storyline online, CD and Word (Firdaus et al., 2022).

Based on the problems above, the researcher carried out a problem-solving strategy and approach by developing learning media based on articulate storylines in differentiated learning. The media products developed have complete features and are able to serve the diversity of student learning styles (differentiated). Among them are having an attractive appearance, there are instructions for use, there are interactive learning materials (text, images, animations and videos), there is development of student worksheets and has innovative learning evaluation features.

Previous research conducted by Marpelin et al., (2023) Agung Ayu Komang Mia Anjali et al., (2023) dan Zaenal et al., (2022) shows that innovative learning media can improve student learning outcomes. Based on several previous studies, it is concluded that interesting and innovative learning media can improve student learning outcomes. However, several previous studies only focused on improving students' cognitive learning outcomes, there has been no research on the development of articulate storyline learning media for differentiated learning.

The results of the publish or perish literature review and the VosViewer bibliometric analysis of the research on the implementation of the merdeka curriculum in elementary schools conducted by the research team, obtained the following description.

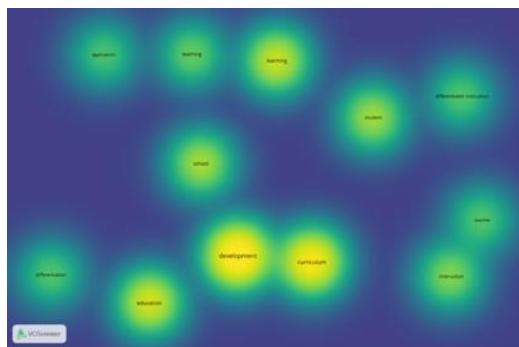


Figure 1. Bibliometric Analysis Results on the Implementation of the merdeka Curriculum in Elementary Schools

Figure 1 This shows that development research and research that examines the merdeka curriculum is very dominant, but the development of learning media, especially the use of **articulate storyline applications in differentiated learning**, is not visible, which means that there is still little or it can even be said that no one has done it.

Based on previous research and the results of the VosViewer bibliometric analysis, it is concluded that the development of learning media based on articulate storylines in differentiated learning of the merdeka curriculum in Elementary Schools is a **novelty in this research**.

The **state of the art** in this research is the development of interesting and innovative learning media based on the articulate storyline application which has complete features starting from the display, usage instructions, teaching materials, learning videos, student worksheets and learning evaluations to facilitate the diversity of student learning styles (differentiated learning).

The aim of this research is to develop learning media based on articulate storylines in learning that has complete features and is able to serve the diversity of student learning styles (differentiated).

RESEARCH METHODS

The method used in this study is the research and development method (Research and Development). The development model applied in this study is the ADDIE development model adopted from Robert Maribe. According to (Pramesti et al., 2021) The ADDIE model consists of five stages, namely analysis, design, development, implementation, and evaluation. The research was conducted at Kaduagung Elementary School class IV 31 students

The following are the steps of development research carried out using the ADDIE model:

- a. **Analysis** includes a) conducting a needs analysis (interviews with the fourth grade homeroom teacher), determining the scope of the teaching material to be developed, c) identifying student characteristics, d) preparing a development plan for learning media based on an articulate storyline;
- b. **Design** includes: a) Preparation of learning media materials based on articulate storylines based on the Elementary School merdeka curriculum book; b) Preparation of a storyboard of learning media to be developed; c) Determining the visual display, audio, animation/video according to the needs in the process of making learning media based on articulate storylines.
- c. **Development** is compiling interesting and differentiated learning media, namely serving the needs of different student learning styles so that all students feel happy in carrying out learning. The media developed through the validation stage by material experts and media experts, aims for the media developed to have appropriate teaching materials and have an interactive appearance. Media and material experts validate learning media based on articulate storylines based on the following validation grids (tables 1 and 2).

Table 1. Media Expert Validation Grid

No	Aspect	Indicator	Item Number	Number of Items
1	Display design	a. Appearance design conformity	1, 2, 3, 4	
		b. Matching menu and button layout	5, 6, 7, 8	11
		c. Font size, color and type	9, 10, 11	
2	Video	d. Video suitability to material	12	1
3	Animation	e. Animation accuracy	13, 14	2
4	Ease of use of media	f. Usefull	15, 16, 17	3
Total				17

Table 2. Material Expert Validation Grid

No	Aspect	Indicator	Item Number	Number of Items
1	Curriculum	a. Suitability of material with basic competencies, indicators, and learning objectives	1, 2, 3	3
		b. The truth, coherence, completeness and depth of the concepts of the material presented	4, 5, 6, 7	
2	Material	c. Suitability of the material to the characteristics of the students and the material is supported by appropriate media	8, 9, 10	7
		d. The use of language and the language used is in accordance with the characteristics of the students.	11, 12	
Total				12

d. **Implementation**, after the product of the development of learning media based on articulate storyline has been completed and has gone through the stage of expert validation revision by the validator, then the media is implemented on grade IV students of Kaduagung Elementary School totaling 31 students. The implementation aims to determine the student response/ease of use of the product that has been made. The following is a table (table 3 and 4) of the teacher and student response questionnaire grids.

Table 3. Teacher Response Questionnaire Grid

No	Aspect	Indicator	Item Number	Number of Items
1	Curriculum	Suitability of material with basic competencies, indicators and learning objectives	1, 2, 3	3
2	Material	Convenience, Correctness, Completeness, Suitability of the material	4, 5, 6, 7 , 8, 9 10	7
3	Grammar	Appropriate language suitability and appropriate characteristics	11, 12	2
4	Display design	Suitability of display design, layout, size, color, and type of font and video	13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23	11

5	Video	Video suitability to material	24	1
6	Animation	Animation accuracy	25, 26	2
7	Ease of use	<i>Usefull</i>	27, 28, 29	3
8	Accuracy	Suitability of Learning Objectives, Materials, and Media	30, 31, 32, 33	3
9	Clarity	Language, Content and Discussion are easy to understand	34, 35, 36	3
10	Interest/ Attention	Interactive learning media motivates learning	37, 38	2
11	Quiz quality	Suitability of quizzes to learning objectives in interactive learning media	39	1
12	Impact on students	Facilitate students' understanding of the material	40	1
Total			40	

Table 4. Student Response Questionnaire Grid

No	Aspect	Indicator	Item Number	Number of Items
1	Attracting students' interest	Clarity and attractiveness of the appearance and content of learning media materials	1, 2, 3	3
2	Presentation of Material	The material presented is clear and easy to understand	4, 5, 6	3
3	Increase student attention	Interactive learning media can increase students' attention	7	1
4	Motivation	Interactive learning media can motivate students	8, 9	2
Total				9

e. **Evaluation (Evaluation)**, at this stage an evaluation of the results of the application of learning media products based on articulate storylines is carried out. The evaluation carried out is by conducting a pretest and posttest then processing it with a t-test (one group pretest-posttest), this is done to determine the effectiveness of the learning media that has been prepared.

RESULTS AND DISCUSSION

RESULTS

a. Media Products

The development activities in this study are based on the ADDIE development steps, namely analysis, design, development, implementation, and evaluation, which are then divided into three core parts, namely 1) Preparation and development; 2) Implementation; and 3) Evaluation.

The stages of compiling and developing media based on needs analysis are interviews with teachers and students. The purpose of this stage is so that the media developed has a basis for development and is in accordance with student needs. The following is a learning media design based on Articulate Storyline in differentiated learning for the merdeka curriculum for class IV of Kaduagung State Elementary School.



Figure 2. Main Menu Display of Articulate Storyline Based Learning Media



Figure 3. Main Menu Display of Articulate Storyline Based Learning Media



Figure 4. Display of Learning Media Material Based on Articulate Storyline

b. Expert Validation and Media Eligibility Questionnaire

The articulate storyline-based learning media that has been compiled based on needs analysis is then validated by material experts and media experts before being implemented to students. The results of the assessment or evaluation can determine improvements to the learning media. Both media experts and material experts carry out validation using predetermined validation instruments (table 5 validation instruments) interpreted in the media eligibility criteria table.

Table 5. Media Feasibility and Practicality Criteria

Percentage	Interpretation Criteria
$75\% \leq P \leq 100\%$	Very Feasible
$50\% \leq P < 75\%$	Feasible
$25\% \leq P < 50\%$	Feasible Enough
$0\% \leq P < 25\%$	Less Decent

The table of 5 eligibility criteria above is used as a reference for decision making as to whether the media prepared is suitable based on the assessment of media and material experts and is declared suitable for use by teachers and students.

Table 6. Validation Results of Learning Media Based on Articulate Storyline

No	Expert/ Validator	Number of Question Items	Percentage	Interpretation Criteria
1	Media Expert	17	95%	Very Feasible
2	Learning Material Expert	12	92%	Very Feasible

Based on the results of the validation of media and material experts, it was concluded that the articulate storyline-based learning media was feasible to use.

After the media was declared valid by both experts, the next stage was to implement it in the learning process to determine its level of feasibility by teachers and students.

Table 7. Feasibility of Articulate Storyline-based Learning Media

No	Expert/ Validator	Number of Question Items	Percentage	Interpretation Criteria
1	Teacher	40	90%	Very Feasible
2	Student	9	87%	Very Feasible

Table 7 shows that based on the media feasibility test from teachers and students, it is concluded that the Articulate Storyline-based learning media has Very Good feasibility and practicality. In the next stage, a t-test (one group pretest-posttest) was conducted to determine the effectiveness of the learning media.

c. T-test

1. Prerequisite Test

a) Normality Test

The purpose of the Normality Test is to determine whether the distribution of data obtained in the research is normally distributed or not.

Table 8. Results of Normality Data Analysis

One-Sample Kolmogorov-Smirnov Test

<i>Unstandardized Residual</i>		
<i>N</i>		31
<i>Normal</i>	<i>Mean</i>	.0000000
<i>Parameters_{a,b}</i>	<i>Std. Deviation</i>	6.75289457
<i>Most Extreme</i>	<i>Absolute</i>	.139
<i>Differences</i>	<i>Positive</i>	.135
	<i>Negative</i>	-.139
<i>Test Statistic</i>		.139
<i>Asymp. Sig. (2-tailed)</i>		.129c

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

The results of the normality test above show that the significance value is $0.129 > 0.05$. So it can be concluded that the data is normally distributed.

b) Homogeneity Test

The homogeneity test aims to test whether the data has the same variance or not and whether the data is homogeneous or not.

Table 9. Results of Homogeneity Test Data Analysis

<i>Test of Homogeneity of Variances</i>		<i>Levene Statistic</i>	<i>df1</i>	<i>df2</i>	<i>Sig.</i>
<i>Hasil</i>	<i>Based on Mean</i>	1.942	1	60	.169
<i>Belajar</i>	<i>Based on Median</i>	1.138	1	60	.290
	<i>Based on Median and with adjusted df</i>	1.138	1	55.558	.291
	<i>Based on trimmed mean</i>	1.785	1	60	.187

The results of the homogeneity test above show that the significance value is 0.169 > 0.05. So it can be concluded that the data is distributed homogeneously.

2. Hypothesis Testing

The research used the T-Test calculated using SPSS 26. This hypothesis test aims to determine the significance value of the learning outcomes of grade IV students of SDN Kaduagung against the tests that have been carried out, namely the pretest and posttest, the T-Test results data are as follows:

Table 10. T-Test Results

<i>Paired Samples Test</i>									
		<i>Paired Differences</i>				<i>95% Confidence Interval of the Difference</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
		<i>Std. Deviation</i>	<i>Std. Error Mean</i>	<i>Lower</i>	<i>Upper</i>				
<i>Pair 1</i>	<i>Pretest - Posttest</i>	6.756	1.213	-30.865	-25.909	-23.39	30	.000	
	7	28.38				4			

Table 10 above shows that the significance results (2-tailed) have a value of 0.000. Therefore, if the significance value is smaller than the basic decision-making formula ($0.000 < 0.05$), it can be concluded that there is a significant influence.

DISCUSSION

The development of learning media based on articulate storylines in differentiated learning of the merdeka curriculum in Elementary Schools can be used as a reference and consideration in choosing a learning media developer application. The results of the development carried out by researchers obtained validation results from media experts of 95% and material experts of 92% with the category Very Suitable for Use. This is because the learning media that was prepared followed the

suggestions of media experts and material experts (Setiawan, U., et al., 2022: 109) to ensure that the media developed was in accordance with quality standards and relevant to learning needs (Torasila, D., Baderiah, & Laswi, A.S., 2024: 317).

The articulate storyline-based learning media developed by researchers has complete features, such as text, colored visual images, audio, video and worksheets. These complete features are to serve different learning styles of students. According to (Demir, 2021) Learning media developed based on students' learning styles can increase students' creativity and talents. Pagarra, dkk (2022: 38) states that learning will be more effective if information is presented in an interesting multimedia format, has text, images and sound. The articulate storyline learning media can help elementary school students in the process of independent and group learning (Aulia & Kurniawan, 2021) because it has an attractive appearance (Rohiat, 2022).

The results of the feasibility and practicality test of the media by teachers obtained a percentage value of 90% and by students 87% with the category of Very Feasible and Practical to be used in the learning process. This result is important because the media that is stated as feasible and practical can be implemented on a larger scale in further research development. Positive responses from students are one of the key factors in the success of implementing learning media (Firmansyah et al., 2020). Articulate storyline learning media has complete features, easy to use (Mumtahana, A., Roesminingsih, M. V., & Suyanto, T: 2020) and interactive in presenting information (Hadza et al., 2020).

The effectiveness test using the Paired Samples T Test shows that the significance results (2-tailed) with a value of 0.000 (0.000 < 0.05) then it can be concluded that there is a significant influence of the use of articulate storyline-based learning media on differentiated learning of the merdeka curriculum in Elementary Schools. These results are supported by previous research conducted by (Chaeruna et al., 2024) that articulate storyline-based learning media significantly improves learning outcomes and critical thinking skills (Heliawati et al., 2022). Good learning media has a positive impact on the learning process and is able to improve learning outcomes (Hanif et al., 2023; Sutisna et al., n.d.).

CONCLUSION

The development of learning media based on Articulate Storyline answers the gap in previous research which only focused on improving students' cognitive learning outcomes, curriculum analysis, and there has been no research on the development of articulate storyline learning media for differentiated learning. The media products developed have complete features and are able to serve the diversity of students' learning styles (differentiated). Among them are having an attractive appearance, there are instructions for use, there are interactive learning materials (text, images, animations and videos), there is the development of student worksheets and has innovative learning

evaluation features. The results of the study of learning media based on Articulate Storyline in the material aspect obtained a very valid assessment of 92%, and the media aspect obtained a very valid assessment of 95%. The feasibility and practicality aspects were 90% by the supervising teacher and 87% by the students. The effectiveness test of the Paired Samples T Test obtained a value of (0.000 <0.05) which means there is a significant influence, so it is concluded that there is a significant influence of the use of articulate storyline-based learning media on differentiated learning of the merdeka curriculum at SD Negeri Kaduagung.

REFERENCES

Aguanda, Setiawan A, Anwar MS, Wardana MRF, Yambasu RA. The Effect of Differentiated Learning on Improving Student Learning Outcomes. *Delta-Phi: Jurnal Pendidikan Matematika*. 2023 Apr 30;1(1):46–50. DOI: <https://doi.org/10.61650/dpjpm.v1i1.199>

Agung Ayu Komang Mia Anjali, I Gede Margunayasa, Ni Wayan Rati. The Appsmart Learning Application Based on the PBL Model Assisted by Articulate Storyline 3 Material on Earth and The Universe. *MIMBAR PGSD Undiksha*. 2023 Aug 21;11(2):198–208. DOI: <https://doi.org/10.23887/jjpgsd.v11i2.60860>

Articulate Storyline. *Indonesian Journal of Applied Research (IJAR)*, 1(2), 80–85. DOI: <https://doi.org/10.30997/ijar.v1i2.54>

Aulia, S. R., & Kurniawan, A. W. (2021). Pengembangan Media Pembelajaran Aplikasi Tentang Variasi Permainan Pencak Silat Berbasis Aplikasi Articulate Storyline. *Sport Science and Health*, 3(12), 929–941. DOI: <https://doi.org/10.17977/um062v3i122021p929-941>

Chaeruna, T., Yulianto, A., & Waluyo, E. (2024). The Impact of Using Articulate Storyline Media on Elementary School Students' Social Studies Interest and Learning Outcomes. *International Journal of Research and Review*, 11(1), 568–577. DOI: <https://doi.org/10.52403/ijrr.20240163>

Demir, S. (2021). Effects of learning style based differentiated activities on gifted students' creativity. *Journal for the Education of Gifted Young Scientists*, 9(1), 47–56. DOI: <https://doi.org/10.17478/jegys.754104>

Dwiputra DFK, Azzahra W, Heryanto FN. A Systematic Literature Review on Enhancing the Success of Independent Curriculum through Brain-Based Learning Innovation Implementation. *Indonesian Journal on Learning and Advanced Education (IJOLAE)*. 2023 Sep 29;5(3):262–76. DOI: 10.23917/ijolae.v5i3.22318

Firdaus FM, Azizah IN, Pritin S, Damayanti O, Annisa FC. The Development of Articulate Storyline-based Learning Media to Improve 5th Grade Students' Mathematical Representation Ability. *Al Ibtida: Jurnal Pendidikan Guru MI*. 2022 Jun 30;9(1):55. DOI: 10.24235/al.ibtida.snj.v9i1.9827

Firmansyah, dkk. (2021). “Development of Articulate Storyline Interactive Learning Media in Learning The History of Labako Batik Using Addie Model To Increase Learning Effectiveness.” *Jurnal Historica university of jember*, 5(2): 90-102. DOI: <https://jurnal.unej.ac.id/index.php/JHIS/article/view/26097/10578>

Fransiska J, Dumiyati D, Mariam P, Hikmah N, Haris M. Education Management in the Independent Curriculum in Elementary Schools. 2023. DOI: <http://dx.doi.org/10.31958/jaf.v11i1.8696>

Hadza, C., Sesrita, A., & Suherman, I. (2020). Development of Learning Media Based on Articulate Storyline. *Indonesian Journal of Applied Research (IJAR)*, 1(2), 80–85. DOI: <https://doi.org/10.30997/ijar.v1i2.54>

Hanif A, Mudinillah A, Windi Lailatur Rahmi P. Development of the Quizizz Platform as an Interactive Quiz-Based Learning Media for Arabic Language Lessons at Madrasah Ibtidaiyah. Vol. 10, International Journal of Membrane Science and Technology. 2023. DOI: <https://doi.org/10.15294/jpii.v7i2.14344>

Heliawati, L., Lidiawati, L., & Pursitasari, I. D. (2022). Articulate Storyline 3 multimedia based on gamification to improve critical thinking skills and self-regulated learning. *International Journal of Evaluation and Research in Education*, 11(3), 1435–1444. DOI: <https://doi.org/10.11591/ijere.v11i3.22168>

Kusumawati D, Sutisna A, Artikel S, Kunci K, Belajar M, Siswa KB. Merdeka Belajar Dalam Konteks Kemandirian Belajar Siswa; Respon Terhadap Regulasi Baru Menteri Pendidikan Dan Kebudayaan. Vol. 6. 2021. DOI: <https://doi.org/10.33222/jlp.v6i1.1644>

Learning Outcomes in Third Grade Elementary School students. *International Journal of Innovative Science Research Technology*, 5(2). DOI: 10.38124/ijisrt

Malacapay MC. Differentiated instruction in relation to pupils' learning style. *International Journal of Instruction*. 2019 Oct 1;12(4):625–38. DOI: 10.29333/iji.2019.12440a

Marpelin NKS, Margunayasa IG, Trisna GAPS. Interactive Multimedia Based on Project-Based Learning Model Using Articulate Storyline 3 Application on the Topic of the Human Digestive System. *International Journal of Elementary Education* [Internet]. 2023 Aug 30;7(3):504–15. DOI: <https://doi.org/10.23887/ijee.v7i3.59645>

Mukhibat M. Differentiate Learning Management to Optimize Student Needs and Learning Outcomes in An Independent Curriculum. *QALAMUNA: Jurnal Pendidikan, Sosial, dan Agama*. 2023 Mar 2;15(1):73–82. DOI: <https://doi.org/10.37680/qalamuna.v15i1.2386>

Mumtahana, A., Roesminingsih, M. V., & Suyanto, T. (2020). Development of Learning Content in Computer Based Media with Articulate Storyline to Improve Civics Learning Outcomes in Third Grade Elementary School students. *International Journal of Innovative Science Research Technology*, 5(2). DOI : 10.38124/ijisrt

Ntobuo NE, Arbie A, Amali LN. The development of gravity comic learning media based on gorontalo culture. *Jurnal Pendidikan IPA Indonesia*. 2018 Jun 1;7(2):246–51. DOI: <https://doi.org/10.15294/jpii.v7i2.14344>

Nursalam N, Muhajir M, Wibowo SA, Suardi S. The Effectiveness of Articulate Storyline 3 Application-Based Interactive Learning Media in Social Studies Learning for Elementary School. *AL-ISHLAH: Jurnal Pendidikan*. 2023 Dec 26;15(4). DOI: <https://doi.org/10.35445/alishlah.v15i4.3061>

Pagarra, dkk. (2022). *Media Pembelajaran*. Badan Penerbit UNM

Pramesti PD, Dibia IK, Ujianti PR. Media Pembelajaran Daring Interaktif Berbasis Power Point dengan Fungsi Hyperlink. *Jurnal Pedagogi dan Pembelajaran*. 2021;4(2):258. DOI: <https://doi.org/10.23887/jp2.v4i2.36524>

Pratiwi KIA, Margunayasa IG, Trisna GAPS. Project-Based Learning Interactive Multimedia with Orientation of Environmental Problems Assisted by Articulate Storyline 3 for Grade V Elementary Schools. *Journal of Education Technology*. 2023 Jun 26;7(2):332–42. DOI: <https://doi.org/10.23887/jet.v7i2.59615>

Rati, Rohiat, S., & Elvinawati, E. (2022). Pengembangan Multimedia Pembelajaran Interaktif Berbasis Problem Based Learning (PBL) Menggunakan Aplikasi Articulate Storyline Pada Materi Ikatan Kimia. *Alotrop*, 6(1), 70–79. DOI: <https://doi.org/10.33369/alo.v6i1.21799>

Riki A, Sutisna A. Penggunaan Alat Peraga Gambar untuk Meningkatkan Hasil Belajar. *Jurnal Lensa Pendas*. 2020;5:24–8. DOI: <https://doi.org/10.33222/jlp.v5i2.1638>

Septinaningrum, Hakam KA, Setiawan W, Agustin M. Developing of Augmented Reality Media Containing Grebeg Pancasila for Character Learning in Elementary School. *Ingenierie des Systemes d'Information*. 2022 Apr 1;27(2):243–53. DOI: <https://doi.org/10.15379/ijmst.v10i2.1207>

Setiawan, U., Dkk. (2022). *Media Pembelajaran*. Bandung: Widina Bhakti Persada Bandung

SF Nasrulloh, A Sutisna. Pengembangan Learning Management System Perguruan Tinggi Berdasarkan Permendikbud No.3 Tahun 2020. *Jurnal Nuansa Informatik*. 2022;6(1):59–65. DOI: <https://doi.org/10.25134/nuansa>

Sutisna A, Rahmawati S. Pengaruh Pembelajaran Tematik Integratif Terhadap Kemampuan Berpikir Kreatif Siswa. *Jurnal Inovatif Ilmu Pendidikan*. 2021;2(2):120–33. DOI: <http://dx.doi.org/10.23960%2Fjiip.v2i2.21820>

Sutisna, A., Zaenal, R. M., & Nur'alin, M. (2023). *Focusky Application-Based Learning Media in the “Merdeka” Curriculum in Elementary Schools*. DOI: <https://doi.org/10.23917/ppd.v10i3>

Torasila, D., Baderiah, & Laswi, A.S. (2024). “Pengembangan Media Pembelajaran Video Animasi Berbasis Aplikasi Kinemaster Materi Gaya Kelas IV SDN 10 Tomarundung.” *Jurnal Pendidikan*, 12(4): 309-320. DOI: <https://doi.org/10.30605/cjpe.222019.233>

Yusuf E, Erviana VY. The Effect of Learning Styles on Learning Outcomes of 4th Grade Elementary School Students. *International Journal of Learning Reformation in Elementary Education*. 2022 Dec 7;1(02):101–8. DOI: <https://doi.org/10.56741/ijlree.v1i02.72>

Zaenal RM, Suryaman O, Sutisna A. Pengembangan Media Pembelajaran Mobile Learning “NUMET” Untuk Meningkatkan Kemampuan Numerasi Siswa Sekolah Dasar. *AKSIOMA: Jurnal Program Studi Pendidikan Matematika*. 2022 Dec 23;11(4):2725. DOI: <http://dx.doi.org/10.24127/ajpm.v11i4.6035>