

# Development of Android-Based Interactive Media Articulate Storyline 3 in the Merdeka Curriculum

Resi Ananda<sup>1\*</sup>, Hadiyanto<sup>1</sup>, Yeni Erita<sup>1</sup>, Yeni Karneli<sup>2</sup>

<sup>1</sup>Elementary School Teacher Study Program FIP, Universitas Negeri Padang, Padang, Indonesia

<sup>2</sup>education technology Program FIP, Universitas Negeri Padang, Padang, Indonesia

Received: July 24, 2023

Revised: September 9, 2023

Accepted: September 25, 2023

Published: September 30, 2023

Corresponding Author:

Resi Ananda

[resiananda14@gmail.com](mailto:resiananda14@gmail.com)

DOI: [10.29303/jppipa.v9i9.5393](https://doi.org/10.29303/jppipa.v9i9.5393)

© 2023 The Authors. This open access article is distributed under a (CC-BY License)



**Abstract:** Media to increase the activities and learning outcomes of class IV students in the merdeka curriculum. The purpose of this study is to create Articulate Storyline media that will be utilized to enhance Class IV primary school students' learning activities and outcomes. The goal of this media's development is to create goods that are reliable, usable, and efficient. The research uses the ADDIE development model with the steps of analysis, design, development, implementation, and evaluation. The validation test uses a validation questionnaire instrument, and the practicality test uses a teacher and student response questionnaire. The research provides data results in the form of teaching module validation results obtained a value of 93.30% (very valid), material validation results of 91.55% (very valid), language validation of 94 % (very valid), and media validation of 96 % (very valid). Based on the results of the small group practicality test response questionnaire of 93 %, the limited group obtained a score of 90.27% (very practical). Individual test results were 88.51 % (very practical) and practicality test based on teacher responses 91% (very practical). In the effectiveness test that an average of 67.2815 or 67.28%, including being effective in improving student learning outcomes.

**Keywords:** Articulate Storyline 3; Interactive Media; Merdeka Curriculum.

## Introduction

At this time it is known as *Society 5.0*, namely the rapid development of artificial intelligence technology that reaches all aspects of human life, including the field of education (Marisa, 2021; Martín-Gutiérrez et al., 2017). Era 5.0 commonly known as the Super Smart Society was ratified by the Japanese state on January 21, 2019. The 5.0 era, has changed the order of people's lives by transforming collections of millions of data into the internet in all aspects so that it can make it easier for people to carry out their lives by utilizing technology (Arsanti et al., 2021; Handayani et al., 2023; Suryaman, 2020). The Society 5.0 era which is influencing the world of education can be seen from the use of digital technology in the learning process (Indarta et al., 2021; Keshav et al., 2022). The development of educational technology refers to the media that teachers will use in learning (Birgili et al., 2021; Tvenge & Martinsen, 2018; Williams & Beam, 2018). Various technology-based

applications are found and can be used to support the learning process, in the application of technology-based media, the abilities and skills of teachers are needed from designing to implementing them in learning (Henriksen et al., 2018; Keshav et al., 2022). Therefore, literacy is needed to increase teachers' understanding of the field of educational technology (Indasari & Budiyanto, 2020).

For this reason, teachers need to continue to strive to improve the quality of learning and create an interesting learning atmosphere by using sophisticated and innovative technological equipment (Husain & Kaharu, 2020; Zukmadini et al., 2021). Teachers can develop technological media in learning to increase student achievement (Elisa et al., 2022; Fadilah & Erita, 2021). At present, elementary schools use merdeka learning curriculum, where learning is not one-way learning but interactive learning, which demands active, student-centered learning (Jojo & Sihotang, 2022; Jufriadi et al., 2022). Ideally, the merdeka curriculum is

## How to Cite:

Ananda, R., Hadiyanto, H., Erita, Y., & Karneli, Y. (2023). Development of Android-Based Interactive Media Articulate Storyline 3 in the Merdeka Curriculum. *Jurnal Penelitian Pendidikan IPA*, 9(9), 6819–6827. <https://doi.org/10.29303/jppipa.v9i9.5393>

carried out by 1) Learning using digital technology-based media. 2) Students become learning centers, not teachers. 3) Students get direct meaningful experience. 4) Students have enough time to explore the concept. 5) Provide opportunities for students to develop by using the facilities at school. 6) Be flexible and flexible. 7) Development of learning based on the needs of students. 8) Learning is interesting and fun. 10) Oriented to process and results (Ardianti & Amalia, 2022; Innayati, 2022). The implementation of merdeka curriculum requires teachers to be able to use digital technology equipment in the learning process in the form of multimedia tools as a medium for delivering learning material to create a fun, interesting, creative, and innovative learning atmosphere (Rahayu et al., 2022; Suryaman, 2020). Multimedia is defined as more than one medium as a means of presenting information in the form of images, text, sound, video, and others using digital devices (Alika & Radia, 2021; Nggraini et al., 2022).

According to experts, learning activities are all activities carried out by teachers and students that can support the learning process (Sari et al., 2021; Sulasmi, 2022). Students' activeness can be seen from participation in activities such as asking questions, providing responses, being able to work together by discussing, while in activities, listening well, carrying out experiments, and mental activities in solving problems (Engeness, 2020; Monika et al., 2022). The ideal hope for learning outcomes is that students can understand the learning process which includes 3 domains, namely cognitive, affective, and psychomotor (Sari et al., 2021; Somayana, 2020). Good learning outcomes can be seen in increasing students' understanding of learning material which can be seen from the evaluation scores that are above the minimum passing standard (Andini & Fitria, 2021).

Conditions in the field during preliminary studies in class IV at a different elementary school in August 2022 at SDN 03 Sungai Puar, and SDN 01 Pasar Palebayan. From these two schools, it can be seen that the learning process uses very little technology-based media, occasionally the teacher displays a projector with a PowerPoint and has never tried Android-based media. If this is not anticipated, it will affect students' interest in learning and students will be less involved in exploring learning concepts which will cause a lack of student activity and involvement in learning. The next problem that the authors found was the low student learning outcomes. So, to overcome this problem, learning media is needed that can influence students' learning activities by the progress and development of the times. Based on analysis and interviews with students, the results showed that students were able to carry out IT-based learning so that they could support the development of

Articulate Storyline media. Teachers use printed books and occasionally use PowerPoint which is only text and not equipped with sound, pictures, or animation in their lessons. Based on the results of observations and interviews from the two elementary schools, the author found several shortcomings such as the lack of use of information technology media in learning. After being interviewed, the teacher did not understand how to develop modern applications as learning media. So that students are also less enthusiastic about learning, and also the low learning outcomes of students seen from the semester scores of students

Articulate Storyline software media can be used to create interesting presentation materials. The advantage of Articulate Storyline is being able to make creative and comprehensive presentations (Juhaeni et al., 2021; Nissa et al., 2021). The features contained in the Articulate Storyline media include Movies, Characters, Pictures, and Time Lines and can be accessed online or offline by students (Firdaus et al., 2022; Sundari & Pasar Maulim Silitonga, 2022). With the Articulate Storyline software, it can make it easier for students to receive the teaching material presented by educators (Jubaerudin et al., 2021; W. P. Rahayu & Ulumiyah, 2021; Safira et al., 2021; Wijayanti et al., 2022).

## Method

The type of research used in this research is development research (Research and Development). Development research is a stage in perfecting existing products or creating new products (Strijker et al., 2020; Trisna, 2022) Development methodology is a type of research used to define and evaluate a subject product. Research development aims to produce products by paying attention to the level of need to overcome problems with a product. Not only in the form of objects or hardware but can also be software or what is called SoftWare (Sugiyono, 2015).

In this study, researchers used the ADDIE model. The steps for implementing the ADDIE development model are Analysis, Design, Development, Implementation, and Evaluation. The preliminary stage is the stage of searching and gathering information. Observation is a preliminary study conducted by the author. Observations were made in August 2022 in cluster 1 of the Palebayan sub-district, namely at SDN 01 Pasar Palebayan, SDN 03 Sungai Puar. During the observation, the writer conducted interviews with the homeroom teacher regarding the media that had been used in class. Based on the results of observations and interviews that have been conducted, the two schools have never used multimedia-based interactive learning media Articulate Storyline.

Development step in this study, researchers used the ADDIE model. The steps for implementing the ADDIE development model are Analysis, Design, Development, Implementation, and Evaluation. The ADDIE development research steps in this study, if presented in chart form, are as Figure 1.

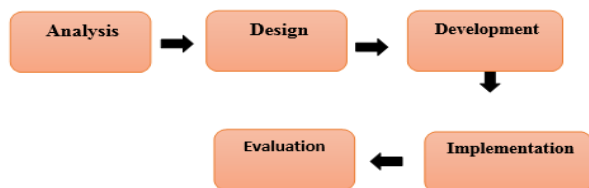


Figure 1. ADDIE Development Model Steps

### Analysis Stage

At this stage, the analysis carried out is needs analysis, curriculum analysis, and material analysis. After conducting observations and interviews, researchers identified that the implementation of learning using instructional media had not been carried out optimally. The use of interactive multimedia learning based on *Articulate Storyline 3* has also never been implemented. Not only this, the characteristics of students and the experience gained in the learning process must also be considered. Therefore, the researcher conducted a needs analysis, curriculum analysis, and analysis of learning materials so that the learning objectives were achieved.

### Design Stage

At this design stage, interactive multimedia design will be carried out in thematic learning based on *Articulate Storyline 3* in class IV SD. The multimedia design includes 1) Interactive multimedia integrated thematic learning *Articulate Storyline*. 2) Interactive multimedia containing Pancasila learning material in class IV elementary school. 3) Interactive multimedia that can attract students' interest. 4) Use language that is easy for students to understand. 5) Use images, videos, and audio that are clear and appropriate to the material. 6) Quiz and practice questions that are appropriate to Civics learning materials and 8) The use of colors and writing can create a learning atmosphere that looks creative and innovative. 9) Interactive Multimedia can recap quiz scores automatically. 10) Interactive Multimedia that provides online certificates automatically.

### Implementation Stage

The implementation stage is the stage for testing the product in a learning process that has previously been designed and validated. The implementation of the use of media begins with preparing all the necessary

facilities and infrastructure and conditioning the classroom environment. After the preparation and availability of equipment is complete, the researcher can apply the media that has been developed in the learning process.

### Evaluation Stage

The evaluation stage is the last in the ADDIE model. At this stage, an evaluation of the interactive multimedia that has been developed is carried out. The success or failure of the learning media will be seen in the questionnaire that will be given to teachers and students. From the questionnaire, it can be seen whether the application of learning media is to initial expectations or not.

### Research subject

The subjects of the development research were as follows: 1) instrument validators, 2) expert validators (linguists and media experts), 3) class IV students at SDN 01 Pasar Palebayan as the control class, and class IV students at SDN 03 Sungai Puar as a comparison class. Meanwhile, the researcher uses *Articulate Storyline 3* media as the research object

### Research Instrument

The instrument that the author uses in media validation is a validation sheet to see the validity of the media being developed. The validation sheet consists of media validation, material validation, and language validation. The material validation instrument contains the suitability of interactive multimedia developed with learning materials that have been adapted to the curriculum. The media validation instrument consists of an interactive multimedia design that has been developed which includes the suitability of the use of letters, layout, images, and colors used in learning media. The linguistic validation instrument consists of linguistic aspects of interactive multimedia which were developed to be easily understood by students.

The learning media practicality instrument aims to determine the practicality of media design from the data collected using the following instruments: Student response questionnaire to the practicality of the integrated thematic learning media that was developed. Teacher response questionnaire to the practicality of the integrated thematic learning media that was developed. The two questionnaires were filled in after the learning process was completed.

Data collection techniques in this research used tests and non-tests. Test techniques are used to determine student learning outcomes and presentation of their completeness. Non-test techniques are carried out using observation and documentation to obtain data

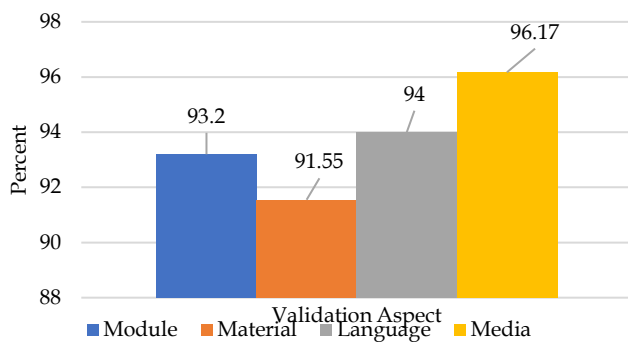
on student learning activities. Done during the learning process.

The effectiveness of the product being developed is obtained from the test results given to students. Product effectiveness testing was carried out using a one-group design Pretest-Posttest Design consists of one predetermined group. In this study, pretest questions were carried out before the treatment, then post-test questions were given after the treatment. In analyzing the effectiveness of the pretest and posttest results using the N-Gain Score.

**Result and Discussion**

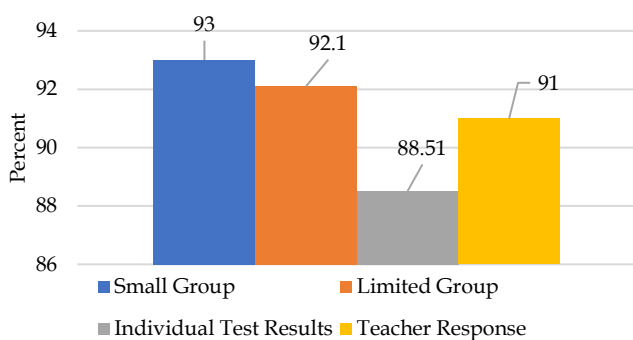
*Media validation*

Articulate Storyline 3 Learning to Improve Activities and Learning Outcomes of Class IV Students.



**Figure 2.** Validation results

From the validation results by experts, the validation score for the class IV teaching module on Pancasila Learning material was 93.20% (very valid), material aspect 91.55% (very valid), language aspect 94% (very valid), media aspect 96, 17 % (very valid ). The validation results from the experts provide information that Articulate Storyline 3 media can be tested in the field. After carrying out validation, we then carried out a practicality test of the module by distributing questionnaires to Articulate Storyline 3 media users. The results were obtained as depicted in Figure 3.



**Figure 3.** Practicality Results

The results of the limited group practicality test obtained a score of 90.27%. Individual results test 88.51% and practicality test based on teacher responses 91% categorized as very practical. The results of teacher and student responses to the practicality of using Articulate Storyline 3 media in learning PPK class IV elementary school independent learning curriculum. To test the effectiveness of using Articulate Storyline 3 media during the learning process of Pancasila Learning class IV, the results of the analysis using SPSS with the N-Gain Score obtained Table 1.

**Tabel 1.** N-Gain Score

N-Gain	Average (%)
Control	45.784
Experimental	67.2815

Based on the results of the Gain test score for the experimental class, an average of 67.2815 or 67.28% was obtained. Including effective in improving student learning outcomes. The results of the N-gain score in the control class with an average value of 32.2078 or 32.20% are categorized as ineffective. So, it can be concluded that the use of Articulate Storyline media is effective in improving student learning outcomes in grade IV Elementary School Civics learning on diverse material.

**Tabel 2.** Normality test

NGain	class	Statistics	Shapiro-Wilk	
			df	Sig.
	experiment	.829	15	.009
	control	.927	11	.377

Based on the output from the SPSS normality test using Shapiro - Wilk with a decision of sig > 0.05, the data is normally distributed, but in the research data it was found that the experimental class data was 0.009 < 0.05, so one of the data was not normally distributed. To see if there is a significant difference using the Mann-Whitney test the following results are obtained

**Tabel 3.** Mann Whitney test

Test Statistics <sup>a</sup>	
Mann-Whitney U	NGain_Percent 24,000
Wilcoxon W	90,000
Z	-3,044
Symp. Sig. (2-tailed)	,002
Exact Sig. [2*(1-tailed Sig.)]	.002 <sup>b</sup>

Based on data from the Mann Whitney Asymp spps test. Sig. (2-tailed) 0.02 < 0.05 As with decision-making in the Mann-Whitney test, there is a significant difference in results between the Pancasila learning outcomes of the experimental class and the control class.

The follow-up is the use of Articulate Storyline media is effective in improving student learning outcomes.

*Student Activity*

The effectiveness test begins by looking at the activeness of students during the learning process. The results obtained to see the activeness of students were obtained through the instrument of student activity with four aspects of assessment including, aspects of Visual activities Oral activities Listening activities writing activities

**Table 4.** The results of observing the activities of students as a whole

School name	Average	Category
SDN 01 Palembang Market	86.05	Very active
SDN 02 Palembang	83.50	Very active
SDN 03 Sungai Puar	84.70	Very active
Overall Average	84.75	Very active

The results of observing the activities of class IV students from SD SDN 01 Pasar Palembang, SDN 02 Palembang, SDN 03 Sungai Puar used articulate storyline 3 media is categorized as very good with an average score of 84.75.

*Media plan*

The design is carried out based on the results of an analysis of the needs of teachers and students. After analyzing color designs and images designed using materials that attract the attention of elementary school students. The material included in the media is adjusted to the learning needs of students with an analysis of learning outcomes and is designed to make learning more meaningful. The material taken is Pancasila learning for class IV elementary school, the curriculum used is the Merdeka Curriculum. In terms of the media that the author has developed consists of learning outcomes, learning objectives, diagnostic assessments, learning materials, learning videos made by the authors themselves, formative assessments, Ice Breaking videos, and different games at each meeting in the form of Mact-ups (matching), Multiple Choice (quiz), Memory (remembering), Crossword (crossword). In terms of appearance, the author uses color, and animation that follows the characteristics of elementary school students by using more animation and more striking colors.

*Media validation*

From the results of validation by experts, a validation score of class IV teaching module Pancasila Learning material was obtained by 93.20% with a very valid category, the material expert validator got a score of 91.55% categorized as very valid, then the language aspects carried out by linguists obtained a score of 94 %

with a very valid category, media aspects by media experts with a score of 96.17% very valid category. The validation results from the experts provide information that Articulate Storyline 3 media can be tested in the field.

The results of the due diligence validation of the product are consulted with the validator, namely lecturers and educators to determine the level of feasibility. Assessments, suggestions, and comments are given by the validator which is used as a reference for revising the product and repairing it so that the media used becomes suitable for use.

*Practicality test*

At this implementation stage students use Android and Articulate storyline learning media are used in teacher-guided learning. At the end of using the teaching materials, the researcher distributed questionnaires to teachers and students to find out the responses to the teaching materials used. The questionnaire distributed to teachers and students contained five aspects including the practicality aspect with 4 questions, the time efficiency aspect with 1 question, the illustration suitability aspect with 1 question, the language aspect with 2 questions, and the evaluation aspect with 3 questions.

The results of the limited group practicality test obtained a score of 90.27%. Individual results test 88.51% and practicality test based on teacher responses 91% categorized as very practical. The results of teacher and student responses to the practicality of using Articulate Storyline 3 media in learning PPK class IV elementary school independent learning curriculum. It can be concluded that the use of articulate storyline media is very practical in elementary school learning.

*Effectiveness Test*

The effectiveness test begins by looking at the activeness of students during the learning process. The results obtained to see the activeness of students obtained through the instrument of student activity with an average yield of 84.75 which is included in the very good category is evidence that students have high enthusiasm in the learning process. So, it can be concluded that Articulate Storyline media can increase student activity.

The value obtained from the effectiveness test is taken using the questions that have been prepared as many as 30 items consisting of 25 multiple-choice questions and 5 filled-in questions. The data obtained for the effectiveness test was obtained by using the pre-test and post-test instruments, namely before and after using the teaching materials developed in the learning process. Pre-test and post-test trials obtained effective results. This statement is confirmed by looking at the results

obtained with an average pre-test score of 51.33, then a post-test was carried out and there was an increase with an average score of 82.33. Then the results of the Pre-test and Post-test were analyzed using the N-Gain Score. The results obtained from the N-Gain test are the percent N-Gain Score of 67.2815 or 67.28% in the effective category. So, it can be concluded that the articulate storyline 3 media in Pancasila learning class IV elementary school learning that researchers have developed is effective in improving learning outcomes and student activities.

Results of previous research. From the validation results, it can be concluded that Android-based interactive educational media using Articulate Storyline 3 was found and is suitable for use as educational media (Fatia, 2020). The value obtained by looking at the score range in the expert validation table of 4.2 to or less than 5.0 makes the development of learning media very good (Nugroho & Arrosyad, 2020). Based on the results of limited trials, a ratio of around 81.93% was obtained for the category of very useful or suitable for use. Suggestions from researchers that application media can be used as learning media and this research is expected to be a reference in conducting research and development (Lestarani et al., 2023). From the results of these data, the researcher concluded that media based on articulate storylines is valid and suitable for use as learning media. interviews and questionnaires (Legina & Sari, 2022).

This study supports earlier research that found that the majority of educational institutions across all levels already implement the autonomous learning curriculum. The development of teaching modules, formerly known as RPPs (Learning Implementation Plans), is one of the contrasts between the independent curriculum and the prior curriculum. The Pancasila student profile exists and can be customized to meet the needs of students, teachers, and schools, according to the autonomous curriculum teaching module's point of view (Bahri, 2020). Valid and useful teaching resources are available to promote independent curriculum learning about the idea and effects of global warming (Rahayu & Ismawati, 2022). Because people will be actively engaged in the learning process by being involved in their needs, engaging, meaningful, and difficult teaching modules will increase interest and motivation to study (Setiawan et al., 2022). It follows from the foregoing justification that the development of interactive media has a highly favorable effect on students. Technology-enabled media has a significant impact on how students acquire knowledge and skills.

## Conclusion

Based on the research results, the value was 93.30% (very valid), material validation results were 91.55%

(very valid), language validation was 94% (very valid), and media validation was 96% (very valid). Based on the results of the small group practicality test response questionnaire of 93%, the limited group obtained a score of 90.27% (very practical). Individual test results were 88.51% (very practical) and practicality test based on teacher responses 91% (very practical). In the effectiveness test using the N-Gain Score test, the average score for classes using Articulate Storyline media was obtained or 67.28% This includes being effective in improving student learning outcomes. The results obtained to see student activity were obtained through the student activity instrument with an average result of 84.75 which is included in the very good category. This is proof that students have high enthusiasm for the learning process. So, it can be concluded that Articulate Storyline media can increase student activity.

## Acknowledgments

We are grateful to Padang State University, The elementary school teachers and the students who made this research possible. Additionally, I'd want to extend my gratitude to the researchers, students and lecturers who contributed to the project.

## Author Contributions

The contribution of this research belongs to the collaboration between college student and advisers. The corresponding author is a college student and the other is the writer's advisers who has directed and guided the writing of this research to completion.

## Funding

This research does not have special funding.

## Conflicts of Interest

This research did not have a conflict during the completion of writing this research. All parties can work together very well.

## References

- Alika, O., & Radia, E. H. (2021). Development of Learning Media Based on Cross Puzzle Game in Science Learning to Improve Learning Outcomes. *Jurnal Penelitian Pendidikan IPA*, 7(2), 173-177. <https://doi.org/10.29303/jppipa.v7i2.667>
- Andini, S. R., & Fitria, Y. (2021). Pengaruh Model RADEC pada Pembelajaran Tematik Terhadap Hasil Belajar Peserta Didik Sekolah Dasar. *Jurnal Basicedu*, 5(3), 1435-1443. <https://doi.org/10.31004/basicedu.v5i3.960>
- Ardianti, Y., & Amalia, N. (2022). Kurikulum Merdeka: Pemaknaan Merdeka dalam Perencanaan Pembelajaran di Sekolah Dasar. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 6(3), 399-407. <https://doi.org/10.23887/jppp.v6i3.55749>

- Arsanti, M., Zulaeha, I., Subiyantoro, S., & Haryati, N. (2021). Tuntutan Kompetensi 4C Abad 21 dalam Pendidikan di Perguruan Tinggi untuk Menghadapi Era Society 5.0. *Jurnal LEMMA*, 3(4), 319-324.  
<http://pps.unnes.ac.id/prodi/prosiding-pascasarjana-unnes/>
- Bahri, B. I. (2020). Pengembangan Bahan Ajar pada Era Merdeka Belajar di SMP Negeri 20 Surabaya. *Seminar Nasional 2020 "Pengatan Pendidikan Karakter Pada Era Merdeka Belajar" Universitas Negeri Surabaya*, 7.  
<http://proceeding.semnaslp3m.unesa.ac.id/index.php/Artikel/article/view/61/67>
- Birgili, B., Seggie, F. N., & Oğuz, E. (2021). The trends and outcomes of flipped learning research between 2012 and 2018: A descriptive content analysis. *Journal of Computers in Education*, 8(3), 365-394.  
<https://doi.org/10.1007/s40692-021-00183-y>
- Elisa, E., Prabandari, A. M., Istighfarini, E. T., Alivia, H., Inayati H, L. W., & Nuraini, L. (2022). Digital Module Innovation Based on Exploration of Physics Concepts Containing Local Wisdom "Making Traditional Snacks" to Support the Formation of Pancasila Students. *Jurnal Penelitian Pendidikan IPA*, 8(6), 2923-2932.  
<https://doi.org/10.29303/jppipa.v8i6.2171>
- Engeness, I. (2020). Developing Teachers' Digital Identity: Towards The Pedagogic Design Principles of Digital Environments to Enhance Students' Learning in The 21st Century. *European Journal of Teacher Education*, 00(00), 1-19.  
<https://doi.org/10.1080/02619768.2020.1849129>
- Fadilah, & Erita, Y. (2021). Pengembangan Media Pembelajaran Interaktif Menggunakan Aplikasi Articulate Storyline pada Pembelajaran Tematik Terpadu Kelas V Sekolah Dasar Keywords: Instructional Media, Articulate Storyline. *Journal of Basic Education Studies* /, 4 no 1, 3173-3186.  
<https://ejournalunsam.id/index.php/jbes/article/view/4092>
- Fatia, I., Ariani |, Y., Media, P., Storyline, A., Faktor, P., Kelipatan, D., Bilangan, S., Iv, K., Dasar, S., & Ariani, Y. (n.d.). 503 Pengembangan Media Articulate Storyline 3 pada Pembelajaran Faktor dan Kelipatan Suatu Bilangan di Kelas IV Sekolah Dasar. <https://ejournalunsam.id/index.php/jbes/article/view/2797>
- Firdaus, F. M., Azizah, I. N., Pritin, S., Damayanti, O., & Annisa, F. C. (2022). The Development of Articulate Storyline-based Learning Media to Improve 5th Grade Students' Mathematical Representation Ability. *Al Ibtida: Jurnal Pendidikan Guru MI*, 9(1), 55.  
<https://doi.org/10.24235/al.ibtida.snj.v9i1.9827>
- Handayani, F., Fitria, Y., Ahmad3, S., & Zen, Z. (2023). Development of E-Module Based on Problem Based Learning Assisted with Scratch Applications to Improve Students Computational Thinking Skills. *Jurnal Kependidikan*, 9(2), 456-469.  
<https://doi.org/10.33394/jk.v9i2.7790>
- Henriksen, D., Henderson, M., Creely, E., Ceretkova, S., Černochová, M., Sendova, E., Sointu, E. T., & Tienken, C. H. (2018). Creativity and Technology in Education: An International Perspective. *Technology, Knowledge and Learning*, 23(3), 409-424.  
<https://doi.org/10.1007/s10758-018-9380-1>
- Husain, R., & Kaharu, A. (2020). Menghadapi Era Abad 21: Tantangan Guru Pendidikan upaten Bone Bolango. *Jurnal Obsesi : Jurnal Pendidikan Anak Usia Dini*, 5(1), 85.  
<https://doi.org/10.31004/obsesi.v5i1.527>
- Indarta, Y., Jalinus, N., Abdullah, R., & Samala, A. D. (2021). 21st Century Skills : TVET dan Tantangan Abad 21. *Edukatif: Jurnal Ilmu Pendidikan*, 3(6), 4340-4348.  
<https://doi.org/10.31004/edukatif.v3i6.1458>
- Indasari, P. N., & Budiyanto, M. (2020). *Theoretical Feasibility of Interactive Multimedia Based on Articulate Storyline in Liquid Pressure*. <https://ejournal.unesa.ac.id/index.php/pensa/article/view/27469>
- Innayati, U. (2022). KURIKULUM MERDEKA. *International Conference on Islamic Education*. <http://proceeding.iainkudus.ac.id/index.php/ICIE/article/view/241/96>
- Jojo, A., & Sihotang, H. (2022). Analisis Kurikulum Merdeka dalam Mengatasi Learning Loss di Masa Pandemi Covid-19 (Analisis Studi Kasus Kebijakan Pendidikan). *EDUKATIF: JURNAL ILMU PENDIDIKAN*, 4(4), 5150-5161.  
<https://doi.org/10.31004/edukatif.v4i4.3106>
- Jubaerudin, J. M., Supratman, S., & Santika, S. (2021). Pengembangan Media Interaktif Berbasis Android Berbantuan Articulate Storyline 3 Pada Pembelajaran Matematika Di Masa Pandemi. *Journal of Authentic Research on Mathematics Education (JARME)*, 3(2), 178-189.  
<https://doi.org/10.37058/jarme.v3i2.3191>
- Jufriadi, A., Huda, C., Aji, S. D., Pratiwi, H. Y., & Ayu, H. D. (2022). Analisis Keterampilan Abad 21 Melalui Implementasi Kurikulum Merdeka Belajar Kampus Merdeka. *Jurnal Pendidikan Dan Kebudayaan*, 7(1), 39-53.  
<https://doi.org/10.24832/jpnk.v7i1.2482>
- Juhaeni, J., Safaruddin, S., & Salsabila, Z. P. (2021). Articulate Storyline Sebagai Media Pembelajaran Interaktif Untuk Peserta Didik Madrasah Ibtidaiyah. *AULADUNA: Jurnal Pendidikan Dasar Islam*, 8(2), 150.  
6825

- <https://doi.org/10.24252/auladuna.v8i2a3.2021>
- Keshav, M., Julien, L., & Miezal, J. (2022). The Role Of Technology In Era 5.0 In The Development Of Arabic Language In The World Of Education. *Journal International of Lingua and Technology*, 1(2), 79–98. <https://doi.org/10.55849/jiltech.v1i2.85>
- Legina, N., & Sari, P. M. (2022). Pengembangan Media Pembelajaran Interaktif Articulate Storyline Berbasis Keterampilan Berpikir Kritis pada Pembelajaran IPA bagi Siswa Sekolah Dasar. *Jurnal Paedagogy*, 9(3), 375. <https://doi.org/10.33394/jp.v9i3.5285>
- Lestarani, D., Tanone, K. L. K., Parera, L. A. M., Lalang, A. C., & Naat, J. N. (2023). Development of Articulate Storyline 3-Based for Chemical Bonding Teaching Materials. *Hydrogen: Jurnal Kependidikan Kimia*, 11(2), 106–115. <https://doi.org/10.33394/hjkk.v11i2.7403>
- Marisa, M. (2021). Inovasi Kurikulum “Merdeka Belajar” di Era Society 5.0. *Santhet: (Jurnal Sejarah, Pendidikan Dan Humaniora)*, 5(1), 72. <https://doi.org/10.36526/js.v3i2.e-ISSN>
- Martín-Gutiérrez, J., Mora, C. E., Añorbe-Díaz, B., & González-Marrero, A. (2017). Virtual Technologies Trends in Education. *Eurasia Journal of Mathematics, Science and Technology Education*, 13(2), 469–486. <https://doi.org/10.12973/eurasia.2017.00626a>
- Minalti, M. P., & Erita, Y. (2021). Penggunaan Aplikasi Nearpod Untuk Bahan Ajar Pembelajaran Tematik Terpadu Tema 8 Subtema 1 Pembelajaran 3 Kelas IV Sekolah Dasar. *Journal of Basic Education Studies*, 4(1), 2231–2246. <https://www.ejurnalunsam.id/index.php/jbes/article/view/3724>
- Monika, T. S., Julia, J., & Nugraha, D. (2022). Peran dan Problematika Guru Mengembangkan 4C Abad 21 di Sekolah Dasar. *Jurnal Cakrawala Pendas*, 8(3), 884–897. <https://doi.org/10.31949/jcp.v8i2.2672>
- Nggiraini, Haryono, H. E., Muntomimah, S. E., Wijayanti, S., & Akbar, R. R. (2022). Strategi Pengembangan Kurikulum Merdeka Belajar Kampus Merdeka Berbasis Individual Differences. 7(1), 64–74. <https://doi.org/10.33369/jip.7.1>
- Nissa, A. D. A., Toyib, M., Sutarni, S., Akip, E., Kadir, S., Ahmad, & Solikin, A. (2021). Development of Learning Media Using Android-Based Articulate Storyline Software for Teaching Algebra in Junior High School. *Journal of Physics: Conference Series*, 1720(1), 0–7. <https://doi.org/10.1088/1742-6596/1720/1/012011>
- Nugroho, F., & Arrosyad, I. (2020). Learning Multimedia Development Using Articulate Storyline for Students. *International Journal of Elementary Education*, 4(4), 575–579. <https://doi.org/10.23887/ijee.v4i4.27763>
- Rahayu, R., & Ismawati, R. (2022). Pengembangan Bahan Ajar untuk Menunjang Pembelajaran Kurikulum Merdeka pada Materi Konsep dan Dampak Pemanasan Global Fase E SMA/MA. *Jurnal Pendidikan MIPA*, 12(September), 682–689. <https://doi.org/10.37630/jpm.v13i2.1091>
- Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital Technologies in Education 4.0. Does it Enhance The Effectiveness of Learning? *International Journal of Interactive Mobile Technologies*, 15(4), 31–47. <https://doi.org/10.3991/IJIM.V15I04.20291>
- Rahayu, R., Rosita, R., Rahayuningsih, Y. S., Hernawan, A. H., & Prihantini, P. (2022). Implementasi Kurikulum Merdeka Belajar di Sekolah Penggerak. *Jurnal Basicedu*, 6(4), 6313–6319. <https://doi.org/10.31004/basicedu.v6i4.3237>
- Rahayu, W. P., & Ulumiyah, A. (2021). Development of mobile learning media based on articulate storyline 3 to support independence learning of vocational high school students in the new normal era. *Proceedings of the Seventh Padang International Conference On Economics Education, Economics, Business and Management, Accounting and Entrepreneurship (PICEEBA 2021)*, 192(Piceeba), 206–218. <https://www.atlantispress.com/proceedings/piceeba-21/125963997>
- Safira, A. D., Sarifah, I., & Sekaringtyas, T. (2021). Pengembangan Media Pembelajaran Interaktif Berbasis Web Articulate Storyline Pada Pembelajaran Ipa Di Kelas V Sekolah Dasar. *Prima Magistra: Jurnal Ilmiah Kependidikan*, 2(2), 237–253. <https://doi.org/10.37478/jpm.v2i2.1109>
- Setiawan, R., Syahria, N., Andanty, F. D., & Nabhan, S. (2022). Pengembangan Modul Ajar Kurikulum Merdeka Mata Pelajaran Bahasa Inggris. *Jurnal Gramaswara*, 2(2), 49–62. <https://doi.org/10.21776/ub.gramaswara.2022.002.02.05>
- Somayana, W. (2020). Peningkatan Hasil Belajar Siswa. *Jurnal Pendidikan Indonesia*, 1(3), 350–361. <https://doi.org/10.36418/japendi.v1i3.33>
- Strijker, D., Bosworth, G., & Bouter, G. (2020). Research Methods in Rural Studies: Qualitative, Quantitative and Mixed Methods. *Journal of Rural Studies*, 78(June), 262–270. <https://doi.org/10.1016/j.jrurstud.2020.06.007>
- Sugiyono. (2015). *Metode Penulisan Kuantitatif, Kualitatif, dan R&D*. Alfabeta.
- Sulasmu, E. (2022). Primary School Teachers’ Digital Literacy: An Analysis On Teachers’ Skills In Using Technological Devices. *Journal of Innovation in Educational and Cultural Research*, 3(2), 140–145. <https://doi.org/10.46843/jiecr.v3i2.81>
- Sundari, C., & Pasar Maulim Silitonga. (2022).



- Penerapan Media Interaktif Articulate Storyline dalam Pembelajaran Ikatan Kimia di SMA. *Educenter: Jurnal Ilmiah Pendidikan*, 1(4), 421–427. <https://doi.org/10.55904/educenter.v1i4.116>
- Suryaman, M. (2020). Orientasi Pengembangan Kurikulum Merdeka Belajar. *Jurnal Bahana Manajemen Pendidikan*, 3(8), 13–28. <https://ejournal.unib.ac.id/semiba/article/download/13357/6512>
- Trisna, S. (2022). Interactive Multimedia Based on Articulate Storylines in the Topic of Plant Anatomy and Physiology. *International Journal of Elementary Education*, 6(2), 182–194. <https://doi.org/10.23887/ijee.v6i2.46837>
- Tvenge, N., & Martinsen, K. (2018). Integration of Digital Learning in Industry 4.0. *Procedia Manufacturing*, 23(2017), 261–266. <https://doi.org/10.1016/j.promfg.2018.04.027>
- Wekerle, C., Daumiller, M., & Kollar, I. (2022). Using Digital Technology To Promote Higher Education Learning: The Importance of Different Learning Activities and Their Relations To Learning Outcomes. *Journal of Research on Technology in Education*, 54(1), 1–17. <https://doi.org/10.1080/15391523.2020.1799455>
- Wijayanti, I.-J. O. S. S. A. H. ;, Utami, F. A., & Sumaji, S. (2022). Development of Articulate Storyline Interactive Learning Media Based on Realistic Mathematical Education (RME) to Improve Critical Thinking Ability of Elementary School Students. *ICCCM Journal of Social Sciences and Humanities*, 1(5), 13. <https://doi.org/10.53797/icccmjssh.v1i5.3.2022>
- Williams, C., & Beam, S. (2018). Technology and Writing: Review of Research. *Computers & Education*. <https://doi.org/10.1016/j.compedu.2018.09.024>
- Zukmadini, A. Y., Karyadi, B., & Rochman, S. (2021).