



## Development Of Blog “Hi Si IPA” On Ecosystem Materials to Improve Science Literacy for Students in Grade V Elementary School

Dini Rosyada Mahmud<sup>1,✉</sup>, Shirly Rizki Kusumaningrum<sup>2</sup>, Radeni Sukma Indra Dewi<sup>3</sup>

<sup>1</sup>Universitas Negeri Malang, Malang, Indonesia

### Abstract

Learning media is an important part of the learning process. Students grade V need learning media blog to make it easier for understand learning material for theme ecosystems. Learning media blog has never been used in ecosystem materials in elementary school. The method used in this research and development using five stages: the model ADDIE (Analysis-Design-Development-Implement-Evaluate). Quantitative data analysis use to process the data results in numbers obtained from filling out validation questionnaires by learning media experts and material experts. Qualitative data take from the suggestions and input of material experts, learning media experts, students, and teachers who perfected the learning media of the blog "Hai Si IPA". The result validation product learning media of the "Hai Si IPA" is 97%. So, the "Hai Si IPA" has an "Excellent" validity criterion. The first result validation blog material of the "Hai Si IPA" is 67% was in the "Good" category, so it needed to be revised. The second result validation is 83%. The material used in the learning media blog "Hai Si IPA" is "Very good." The advantages blog "Hai Si IPA" has an attractive design includes background, layout, images, quiz and animated videos so that students don't get bored easily using it and have their brand namely "Hai Si IPA".

**Keywords:** Learning media, Blog, Science

## Pengembangan Blog "Hai Si IPA" Pada Materi Ekosistem untuk Meningkatkan Literasi Sains Siswa Kelas 5 Sekolah Dasar

### Abstrak

Media pembelajaran merupakan bagian penting dari proses pembelajaran. Siswa kelas V membutuhkan media pembelajaran blog untuk mempermudah dalam memahami materi ekosistem. Media pembelajaran blog belum pernah digunakan dalam materi ekosistem di sekolah dasar. Metode yang digunakan dalam penelitian dan pengembangan ini menggunakan lima tahapan yaitu model ADDIE (Analysis-Design-Development-Implement-Evaluate). Analisis data kuantitatif digunakan untuk mengolah data hasil berupa angka yang diperoleh dari pengisian angket validasi oleh ahli media pembelajaran dan ahli materi. Data kualitatif diambil dari saran dan masukan ahli materi, ahli media pembelajaran, siswa, dan guru yang menyempurnakan media pembelajaran blog "Hai Si IPA". Hasil validasi produk media pembelajaran "Hai Si IPA" adalah 97%. Jadi "Hai Si IPA" memiliki kriteria validitas "Sangat Baik". Hasil pertama validasi materi blog "Hai Si IPA" sebesar 67% berada pada kategori "Baik", sehingga perlu direvisi. Hasil validasi kedua adalah 83%. Materi yang digunakan dalam media pembelajaran blog "Hai Si IPA" adalah "Sangat Bagus". Kelebihan blog "Hai Si IPA" memiliki desain yang menarik meliputi background, layout, gambar, kuis dan video animasi sehingga siswa tidak mudah bosan menggunakannya dan memiliki brand yaitu "Hai Si IPA"

**Kata kunci:** Media pembelajaran, Blog, IPA

✉ Corresponding Author: Dini Rosyada Mahmud  
Affiliation Address: Jl. Semarang No.5, Sumbersari, Lowokwaru, Malang  
E-mail: [dini.rosyada.2221038@students.um.ac.id](mailto:dini.rosyada.2221038@students.um.ac.id)

## INTRODUCTION

Learning is a process that aims to develop students' self-potential, including cognitive, affective, and psychomotor aspects. Good learning must understand students' characteristics so that teachers can create a meaningful learning atmosphere for students (Kostiainen et al, 2018). One of them, teachers have creative teaching skills to realize meaningful learning for students, such as creating and using learning media. Learning media is one of the tools used by teachers in clarifying a material so that it is easily understood and makes meaningful learning for students (Sadiman, 2008). Learning media can arouse students' thoughts, interests, and attention in the learning process.

Learning media is an intermediary in conveying and clarifying the content of learning materials. Learning media is essential in teaching and learning process activities to achieve creative and meaningful learning (Kelana, 2018). In Sadiman's (2008) opinion learning media is a physical means used to send messages to students to stimulate them to learn. So, learning media is anything that can convey and distribute notes from a source in a planned manner, creating a conducive learning environment where students can obtain an efficient, effective, and accessible learning process in understanding the material.

Learning media are also dynamic or follow the era of development there is a need for the development of learning which, is an attempt to improve the product or revise the product which has existed. According to Majid (2005), the development of learning media is one of the processes in producing learning media products by using pay attention to the needs and characteristics of students.

The ease of internet access also influences the learning process (Setiawan & Iasha, 2020). One of them is the development of online learning media through blogs. The blog is an acronym for weblog. The blog is one type of website that can be developed by individuals using the software so that it is straightforward to use and can display instant online media publications, which contain content in the form of writing, videos, photos, and others (Fatmayanti, 2015). The general purpose of blog media is to support the implementation of teaching and learning to make it easier for teachers to convey learning material and information and as a means of student learning without meeting face to face (Handono, 2013).

Blogs are one type of website that individuals can develop using software so that it is very easy to use and featuring instant online media

publications, which contain good content in the form of writing, videos, photos, and others. According to Fatmayanti (2015) teacher can develop and use web media or educational blogs that can be read and studied by students and can be accessed anytime and anywhere.

Learning media blogs contain material, one of which is learning science (Natural Sciences). Science has three terms, namely "Science," "Knowledge," and "Nature." Knowledge is anything known to humans, and humans have a variety of knowledge about what experience and what is in the natural environment (Wisudawati & Sulistyowati, 2014). Innate knowledge is material related to the universe and its contents. At the same time, science is the knowledge that explores naturally. Science has two properties, namely rational (logical and reasonable) and objective (according to observations). So that Natural Science (IPA) defines as a science that studies the causes and effects of events in nature.

Analysis of learning needs in research and development is related to learning media developed according to the development of student characteristics in class V Elementary School. Teachers need learning media blogs to add online learning resources. Students need learning media blogs to make it easier for students to understand learning material for class V theme five sub-theme one about ecosystems, in lessons 1, 2, and 5 discuss ecosystems such as ecosystem types, animals classified based on the kind of food, and the life cycle of the animal.

Based on the needs analysis, the objectives of this development research include, (1) Produce products in the form of learning media for the Hai Si IPA blog on the ecosystem material for class V Elementary School which is declared feasible by material experts, (2) Produce products in the form of learning media for the Hai Si IPA blog on Elementary school grade V ecosystem material which was declared feasible by learning media experts, and (3) Produce products in the form of learning media for the Hai Si IPA blog on grade V Elementary School ecosystem materials that are interesting for students and teachers.

## METHODS

The method used in this thesis is research and development. Research development is a process used in developing and validating educational products (Setyosari, 2016: 276). This research has cyclical steps consisting of a study of the research findings of the product to be developed. This research develops a learning media blog "Hai Si IPA

to improve scientific literacy, using five stages: the model ADDIE (*Analysis-Design-Development-Implement-Evaluate*) (Branch, 2016: 2009: 2). The subjects used to implement this blog's learning media product are fifth-grade students at SDN Polehan 3 Malang City.

The research steps for developing the ADDIE model include (1) Analysis first stage is needs analysis, knowing the characteristics of students, curriculum, and learning media. (2) Design, the second stage is to develop product designs, product manufacture, and research instruments. (3) Development, in this third stage, researchers carry out product development and product validation "Hai Si IPA. (4) Implementation, the researchers implemented the learning media blog "Hai Si IPA" to students. (5) Evaluation, the fifth stage is to evaluate the research on learning media development for the blog "Hai Si IPA" to improve the learning media of the blog "Hai Si IPA" learning media.

The types of data used in this development research are quantitative and qualitative. quantitative data from filling out the validity test sheets of material experts and learning media experts. The practicality test takes from users filling out the attractiveness questionnaire, namely students and teachers of class V who had implemented online learning using the blog "Hai Si IPA". Qualitative data take from the suggestions and input of material experts, learning media experts, students, and teachers who perfected the learning media of the blog "Hai Si IPA".

Quantitative data analysis use to process the data results in numbers obtained from filling out validation questionnaires by learning media experts and material experts. Development research questionnaires give to teaching media experts, material experts, and users who used a Likert scale to measure the data presented in the following table.

Table 1. Skala Likert

Score	Evaluation
5	Very good
4	Well
3	Enough
2	Not good
1	Very Not Good

Source: Sugiyono (2015)

He results of the acquisition of scores of material experts, learning media experts, and users can be converted into percentages using the formula from Akbar (2015).

$$Vah = \frac{Tse}{Tsh} \times 100\%$$

Information:

Vah = Expert validation

Tse = Total score obtained

Tsh = Maximum total score

Table 2. Criteria for Validation Results Category Material Experts, Learning Media Experts, Users (Teachers and Students)

Achievement rate (%)	Category	Test Decision
80,01-100,00	Very valid/ very practical/ very interesting/ very independent	Can be used without revision.
60,01-80,00	Valid/ practical/ interesting/ independent	Can be used, but needs minor revision
40,01-60,00	Less valid/ less practical/ less attractive/ less independent	Can be used with major revisions
20,01-40,00	Invalid/ impractical/ unattractive/ not independent	Cannot be used and need major revision
00,00-20,00	Very invalid/very impractical/very unattractive/very not independent	Cannot be used

Source: Akbar (2015)

## RESULTS AND DISCUSSION

Development begins with analyzing the need for learning media that will be developed, in addition to knowing the existence of problems related to learning media. According to Sari (2017) needs analysis is a major step in determining the potential need for media learning is developed. The results of the needs analysis obtained through school observations, teacher interviews, and student questionnaires about the needs learning media blog "Hai Si IPA" in class V SDN Polehan 3 Kota Malang.

Development begins with analyzing the need for learning media to develop. Based on the observations and needs questionnaires, students and teachers only use teaching resources from textbooks and thematic books from the Ministry of Education and Culture. Besides that, learning media such as blogs has never been used. The material in the product to be developed, namely Natural Science (IPA), based on a questionnaire on student needs about science material, especially ecosystems.

The next stage is learning media development, and the researcher makes a blog, "HAI Si IPA." In the development stage, several activities include collecting relevant sources in enriching material sources, making illustration images and animated videos, charts and graphs needed, typing and arranging layouts on the media, and validating development and revision media products that have given suggestions. And input from media and materials experts (Tegeh et al., 2015).

Learning media in the form of online products, namely the blog "Hai Si IPA", has been validated by a lecturer in the Education Technology Study Program, State University of Malang, conducted on June 1, 2022. Learning media experts assess the appearance and systematic aspects of the blog "Hai Si IPA". The following are the results of the validation of teaching media experts on the blog "Hai Si IPA":

The blog "Hai Si IPA" product has tests for validity, namely learning media experts, science material experts, and student interest questionnaires as users. The assessment carries out by filling out the validation instrument given to the validator in which there are various valuable inputs and suggestions for evaluation material for the blog "Hai Si IPA".

Table 3. Learning Media Validation Results

No.	Assessment Aspect	Score
1.	The suitability of the background selection on the blog	5
2.	The suitability of the layout proportions on the blog	5
3.	Image proportion on blog	5
4.	The suitability of the image with the material	5
5.	Image quality on the blog	5
6.	Audio quality on learning videos	5
7.	The suitability of the selection of audio in the learning video	5
8.	The suitability of the selection of fonts on the blog	4
9.	The suitability of choosing the color of the letters on the blog	4
10.	The suitability of choosing the font size of the letters on the blog	4
11.	The suitability of the video with the material on the blog	5
12.	The quality of the learning videos on the blog	5
13.	Proportion of serving text on the blog	5
14.	Compatibility with user characteristics of elementary school students	5
15.	Complete instructions for use on the blog	5
16.	Display instructions for use on the blog	5
17.	Effective use of blogs	5
18.	The suitability of the function of the navigation buttons on the blog	5
19.	The suitability of the performance of the navigation buttons on the blog	5
20.	Interesting animation on the blog	5
Total score		97
Maximum score		100
Percentage of score results		97%

Based on the Table 3, the validation results of the blog "Hai Si IPA" by learning media experts are 97%. So the learning media product for the blog "Hai Si IPA" has an "Excellent" validity criterion. However, from the validation results of learning media experts, the assessment has not been a maximum value of 100 because some things need to be improved a little. There are suggestions and input from learning media experts on the "Hai Si IPA" product, which is optimization in the visual aspect of typography, namely the type and font size.

The material used in the blog "Hai Si IPA" was valid by the lecturer of the Elementary School Teacher Education Study Program, State University of Malang, which carry out twice. Science material experts judge based on linguistic aspects, content, and presentation of material in the blog "Hai Si IPA". The Table 4 is the result of validating the "Hi Si IPA" blog by a material expert.

In Table 4, the results of the first validation of the blog "Hai Si IPA" by material exports amounted to 67%, then the material in the "Hai Si IPA" learning media blog was in the "Good" category, so it needed to be revised. In addition. There are suggestions and input from material experts including, (1) KD analyzes but the learning objectives have not reached the level of analysis, (2) Learning objectives with an inadequate amount of material, (3) Discussing ecosystems should start from the understanding of individuals, populations, and the community, (4) there should be much material in the learning objectives, (5) the practice questions are too easy, (6) the concept of the material arrange in order, (7) the right questions also look at the learning objectives that have developed from the indicators.

After the first validation, the researcher revised the lesson plans and the material contained in the blog "Hai Si IPA", which carries out in the second validation of the material expert, the results obtained from the proof of the blog "Hai Si IPA" by material experts were 83%. The material used in the learning media blog "Hai Si IPA" with "Very good." However, the assessment has not reached a maximum value of 100 because there is something that revises again.

There are suggestions and input from experts including, (1) The arrangement of the material adjust to the learning objectives, (2) The learning objectives for practice questions do not need to include, but mainly review the material, (3) The actual learning objectives base on indicators, but indicators need to measure from KD (for example, analyzing the achievements in indicators should



also adjust), (4) Practice questions are too easy for the HOTS level.

Table 4. Results of Material Validation 1 and 2

No.	Assessment Aspect	Validation 1 Score	Validation 2 Score
1.	Clarity of competency standard instruments	5	5
2.	Compatibility of basic competencies with core competencies	5	5
3.	Clarity of learning objectives to be achieved	3	3
4.	Scope and depth of goals to be achieved	2	3
5.	The scope of the material is clearly described and easy to follow	4	5
6.	The learning sequence is clear and easy to follow	2	5
7.	Clarity of the language used	4	5
8.	Clarity of material according to learning objectives	2	4
9.	Interesting material content	3	4
10.	The benefits of the device objectively help student learning	4	5
11.	Accuracy of pictures and illustrations according to material	4	5
12.	The accuracy of the terms on the material	4	5
13.	The accuracy of practice questions	3	3
14.	The accuracy of choosing the material and the truth of the concept	3	4
15.	Ease of understanding the material	3	4
16.	Availability of examples and practice questions in learning activities	3	4
17.	Balance practice questions with material	3	3
18.	Clarity of Assignment Instructions in working on questions	4	5
19.	Types of Questions and Tests according to the indicators	3	3
20.	Suitability of practice questions with the material	3	3
Total score		67	83

### The validity by learning media experts

The assessment is carried out through filling out the given validation instrument to the validator in which there are various inputs and suggestions useful for evaluation material for the blog "Hi Si IPA". On media rating learning includes aspects of the display. According to [Asyhar \(2012\)](#) media experts examines the characteristics and quality of video, image, animation, text, and audio on learning Media. When assessing it using validation indicators.

For the results of the expert validation of the learning media blog "Hai Si IPA" obtained value of 97%. Then the learning media product of the blog "Hi Si IPA" has validity criteria "Very good" because according to media development validators. This already pays attention to the points in the media development indicators learning.

- a) Background selection
- b) Layout settings
- c) Images on the blog
- d) Audio quality in the learning video
- e) Selection of font type, color, and font size
- f) Design learning videos using animation
- g) The text used in the blog
- h) Complete instructions for use are on the blog
- i) Animation used in the blog
- j) The menus and functions in the blog are complete and clear

According to [Asyhar \(2012\)](#) the criteria for a good learning media pay attention to the following aspects, (1) Clear and neat, (2) Clean and attractive, (3) According to the user's target, (4) Media in accordance with the material being taught, (5) According to learning objectives, (5) Practical, flexible, durable, (6) Good quality.

### Validity by material expert

The material assessment includes aspects of the instrument, language, and content validation twice, namely the first and second validation, after validation revised twice. According to [Sukmadinata \(2016\)](#) material validation examines the material and learning aspects, such as the suitability of the material with the curriculum (content standards), appropriate lesson plans, material coverage, and accuracy of material selection according to learning media.

The results of the validation of the material in the blog "Hi Si IPA, were the first to get the value of 67%, then the material in the learning media blog "Hai Si IPA" has validity criteria "Valid/good", and needs revision. After validating the material, the researcher revised the learning instrument in which there is appropriate ecosystem material within the blog "Hi Si IPA". After the first

validation, revisions are made to learning instruments.

- a) Improve learning objectives on the instrument according to the material.
- b) Adding individual, population, and community materials.
- c) Fix a lot of material by dividing according to the purpose learning 1, 2 and 5.
- d) Fixed questions to HOTS level.

Based on the second validation, the results obtained from the validation of the blog "Hai Si IPA" by material experts is 83%, then the material in the learning media blog "Hai Si IPA" has a validity criterion of "Very valid/very good". However, the assessment has not yet reached a maximum value of 100 because there are some needs to be improved a little, there are suggestions and input from media experts learning.

- a) The arrangement of the material is adjusted to the purpose learning.
- b) For the purpose of learning, there is no need for practice questions entered.
- c) The learning objectives are correct the basis of the indicator.
- d) The practice questions are too easy, not enough for the HOTS level. So done improvement for the second time to develop better learning media.

### **Trial of learning media of Hai Si IPA's blog**

After through the design development stage, validation and revision by experts, then the implementation stage. According to [Tegeh et al., \(2015\)](#), at the implementation stage of the development, learning media is applied in the learning process to determine the quality, including effectiveness, attractiveness, and efficiency. They are implementing the learning media product for the blog "Hai Si IPA" theme five ecosystems for fifth-grade students at SDN Polehan 3 Malang City three times through online learning using Google Meet.

The learning media blog "Hai Si IPA" was implemented for 20 subjects with different knowledge and understanding of ecosystems. Implementation on the first day begins with giving a questionnaire to find out students' knowledge about learning media blogs. Then the execution is carried out using the learning media blog "Hai Si IPA" on theme five ecosystems, sub-theme one ecosystem components, learning 1, 2, and 5.

Implementation of learning media blog "Hai Si IPA" for students. On the last day of performance, students give a questionnaire on their interest and interest in the learning media of the blog "Hai Si IPA". The final stage, namely, evaluating product development improvements, was carried out after

receiving input and suggestions from learning media experts and material experts validators. The development research step ends at the stage of evaluating the improvement of the product development learning media blog "Hai Si IPA."

### **Advantages and disadvantages of blog**

The advantages of the blog "Hai Si IPA" include (1) It has an attractive design, the design includes background, layout, images, and animated videos so that students don't get bored easily using it and have their brand, namely "Hai Si IPA," (2) Blog "Hai Si IPA" IPA can be accessed using the internet anywhere and anytime using a cellphone or laptop, (3) The learning media blog "Hai Si IPA" can be used in learning to create interactive learning and help to provide explanations and understanding of many ecosystem materials coherently.

Besides that (4) Can be used in online and offline learning by students and teachers in elementary schools, (5) The learning media blog "Hai Si IPA" also has HOTS practice questions related to ecosystem material so that it can hone students' thinking skills through Quiziz. The result reinforced, according to [Musfiqon, \(2012\)](#), the advantages of multimedia-based media such as; (1) being more attractive to students because there are various features and animations; (2) being more effective and efficient; (3) more practical; (4) students absorb more material because according to the learning modality.

The disadvantages of the blog "Hai Si IPA" include (1) To access blogs from home or school, they must use internet access because blogs are digital media, and (2) students and teachers must know using information and communication technology to access blogs. The result reinforced, according to [Musfiqon, \(2012\)](#), the weaknesses of multimedia-based media such as (1) Must use internet access, and (2) Teachers and students are not yet skilled in operating multimedia.

### **CONCLUSION**

Based on the results of research and development of this learning media, it can conclude that:

This research and development produce a product in a learning media blog, "Hai Si IPA," on the theme of 5 ecosystems, sub-theme 1 of ecosystem components, learning 1, 2, and 5 for grade V Elementary School. The steps taken to develop the learning media for the blog "Hai Si IPA" using the ADDIE method, including 1) field needs analysis, 2) product design for blog development, 3) blog development, 4) implementation for blog trials, and 5) evaluation for blog improvement.

Produce products in learning media for the Hai Si IPA blog on the ecosystem material for class V Elementary School which is declared feasible by learning media experts. The validation test results by learning media experts obtained a percentage of 97% because, according to the validator of this media development, they had paid attention to the points in the indicators of the development of learning media.

The results of the validation of the material in the blog "Hi Si IPA is the first to get a score of 67%, then the material in the learning media blog "Hai Si IPA" has a validity criterion of "Valid/good" so that the material used, but it needs to revisit so that the revision and validation of the second material carry. The second validation scored 83%, so the material in the learning media blog "Hai Si IPA" has a validity criterion of "Very valid / very good."

Produce products in learning media for the Hai Si IPA blog on the ecosystem material for class V Elementary School which is declared feasible by learning media experts. The validation test results by learning media experts obtained a percentage of 97% because, according to the validator of this media development, they had paid attention to the points in the indicators of the development of learning media. However, the assessment has not yet reached a maximum value of 100 because a few things need to be improved.

Produce products in learning media for the Hai Si IPA blog on the fifth-grade elementary school's exciting material for students and teachers. For the attractiveness test filled in by students as users, the average results of students answered "Strongly agree" and "Agree." So, conclusion that the blog "Hai Si IPA" has very valid, practical, and exciting criteria to be used as a learning medium by students and teachers in elementary schools.

Suggestions generated based on research that has do as follows: 1) This blog product is helpful for learning, and teachers can develop blogs with a broader scope or use other materials. 2) If the teacher wants to create a blog, pay attention to the animation design, color, and type of font used. 3) Adding HOTS questions to the blog.

## REFERENCES

- Akbar, S. (2015). *Instrumen Perangkat Pembelajaran*. Bandung: Remaja Rosda Karya.
- Asyhar, Rayandra. 2012. *Kreatif Mengembangkan Media Pembelajaran*. Jakarta: Referensi Jakarta.
- Branch, R. M. (2009). *Instructional Design: The ADDIE Approach*. London: Springer.
- Fatmayanti, Andi. (2015). Pengembangan Media Blog Sebagai Sarana Informasi Untuk Meningkatkan Kemampuan Perencanaan Karir Di Sman 1 Bulukumba: *Jurnal Psikologi Pendidikan & Konseling*,1 (2), 163-169. <http://ojs.unm.ac.id/index.php/JPPK>.
- Handono. (2013). Pengembangan Materi Layanan Informasi Studi Lanjut Melalui Media Blog di SMA Negeri 4 Bojonegoro. *Jurnal BK UNESA*, 4 (1), 109-118. Retrieved from <https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-bk-unesa/article/view/6232/7092>.
- Kelana, J. B. (2018). The effect of the learning media and the ability to think creative of to the ability to science literacy student of elementary school. *PrimaryEdu: Journal of Primary Education*, 2(2), 79-86.
- Kostiainen, E., Ukskoski, T., Ruohotie-Lyhty, M., Kauppinen, M., Kainulainen, J., & Mäkinen, T. (2018). Meaningful learning in teacher education. *Teaching and Teacher Education*,
- Majid, Abdul. 2005. *Perencanaan Pembelajaran : Mengembangkan Kompetensi Guru*. Bandung: Remaja Rosdakarya.
- Musfiqon. (2012). *Pengembangan Media Belajar Dan Sumber Belajar*. Jakarta : Prestasi Pustakakarya.
- Sadiman, Arief. (2008). *Media Pembelajaran: Pengertian, Pengembangan dan Pemanfaatannya*. Jakarta: Raja Grafindo Persada.
- Sari, Bintari Kartika. (2017). Desain Pembelajaran Model ADDIE dan Implementasinya dengan Teknik Jigsaw. *Jurnal Fakultas Keguruan dan Ilmu Pendidikan Universitas Muhammadiyah Sidoarjo*, 2-4. Retrieved from <http://eprints.umsida.ac.id/432/>.
- Setyosari, P. (2016). *Metode Penelitian Pendidikan dan Pengembangan*. Jakarta: Prenadamedia Group.
- Setiawan, B., & Iasha, V. (2020). Covid-19 pandemic: The influence of full-online learning for elementary school in rural areas. *JPsD (Jurnal Pendidikan Sekolah Dasar)*, 6(2), 114-123.
- Sukmadinata, Nana Syaodih. (2016). *Metode Penelitian Pendidikan*. Bandung: PT Remaja Rosdakarya.
- Sugiyono. (2015). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif dan R&D)*. Bandung: Penerbit CV. Alfabeta.

Tegeh, I Made dkk. (2015). Pengembangan Buku Ajar Model Penelitian Pengembangan Dengan Model Addie. *Jurnal IKA*, 11 (4), 12-26. <https://doi.org/10.23887/ika.v11i1.1145>.

Wisudawati, Asih Widi & Eka Sulistyowati. (2014). *Metodologi Pembelajaran IPA*. Jakarta: Bumi Aksara.