Bioilmi: Jurnal Pendidikan P-ISSN: 2503-4561
Vol X, No 1, Juni 2024. E-ISSN: 2527-3760

Validation of Problem-Based Learning Videos on Environmental Pollution Material for Class VII SMP NU Palangkaraya

Nur Khusna[1*], Ayatus Sa'adah[2], Mukhlis Rohmadi[3]

[1,2,3] Program Studi Tadris Biologi, Institut Agama Islam Negeri Palangkaraya

*cahayakebaikan1202@gmail.com

Article Info

Article history:
Received: 19/05/2024
Revised: 22/05/2024
Accepted: 10/06/2024

Keywords:
Environmental Pollution,
Learning video,
Media,
Problem Based Learning,
Validation

Abstract

Media in the form of problem-based learning videos (PBL) is very necessary when learning material related to environmental pollution. This research aims to see the feasibility of learning videos based on material problems related to environmental pollution, as proven by the evaluation results of validation experts, namely material validators and media validators. This research was conducted on 26 class VII students at SMP NU Palangkaraya. The method used in this research is Research and Development (R&D) which adopts the ADDIE (Analyze, Design, Develop, Implement, Evalute) development model. The media developed by researchers is designed based on the parameters of problem-based learning activities. The validation results from the material and media validators show that the criteria are feasible, with percentages of 74% and 88.9 % respectively. Based on the results of this research, it can be concluded that problem-based learning videos on environmental pollution material are suitable for use in learning.

INTRODUCTION

Education is not only seen as an effort to provide information and the formation of skills, but is enlarged to include efforts to realize individual desires, needs and abilities so that a satisfactory pattern of personal and social life will be achieved, and not only as a means of preparing for the life to come (Rahman et al , 2022) . Learning is closely related to the world of education which is known as learning. Learning is a process of student interaction with teaching staff and many other components in a learning environment with the hope of increasing knowledge, skills and habits. In order to create a pleasant teaching and learning interaction process and motivate students to be actively involved, there are several factors that need to be considered, including learning media (Aini et al, 2023) .

Learning media is one of the factors that plays an important role in the learning and teaching process. Teachers usually use media as a tool in learning to help students understand the material. The use of learning media in the teaching and learning process can develop new interests and desires, generate motivation and even have a psychological influence on the learning process (Wulandari et al , 2023) . In order to create an interesting, practical and motivating learning environment for students, teachers need to develop media, for example video. Based on findings through literacy and identification studies, developing videos in the future has a great opportunity to influence future learning activities. Realistic depictions really help students' understanding during learning activities. Even students also experience differences in their learning activities. Students' vision will also increase and it is hoped that this will encourage the emergence of students' creativity. Video as a sound and image medium can show realistic events in natural science . (Yuliono et al, 2014)

Science learning is a science that examines natural phenomena by applying exploration, experimentation, drawing conclusions, and developing theories of knowledge (Wedyawati & Lisa,

2019). Science learning supports science and technology and the science learning process seeks to provide direct experience for students to understand and explore the natural surroundings scientifically (Yulmasleli, 2020). One of the materials studied in science learning is environmental pollution. Natural science was born from observations of natural phenomena (phenomena), natural phenomena that are often encountered in the environment are environmental pollution. Environmental pollution and its impact on ecosystems is material taught to students in class VII. In this material, students usually tend to be assigned to just read the material. This is certainly less able to provide learning experiences for students. Because of this, learning media is needed that allows students to carry out learning activities other than reading, for example playing quizzes, watching learning videos, practicing *game*- based questions , or being able to interact with teachers (Faradisa et al , 2021) .

Problem - *based* learning is a learning model in which students are faced with a real problem that they have experienced (Ardianti, Sujarwanto, & Surahman, 2021). The problem-based learning model is a learning model that focuses on students and challenges students to think critically when solving problems, so that students can find solutions to the problems they find, and students are also required to hone high-level thinking skills through reports that must be made at the end of learning (Shofiyah, 2018). This is in line with research entitled "Development of PBL-Based Video on Animal Life Cycle Material in Class IV Science Content at SD 15 Dauh Puri, West Denpasar District" (Anggreni et al , 2021) *with the* overall research results from expert assessments and qualified individual tests being very good. There is also research entitled " Problem Based Learning Videos on Caloric Materials for Class VII Students" (Yuliono, Sarwanto, & Wahyuningsih, 2014) with the results of the validation research showing that the problem-based learning video product developed meets the criteria both in terms of material and media aspects. The difference between this research and previous research lies in the topic raised by the author, namely environmental pollution in junior high school students. It is hoped that this research will make a good contribution to the world of education.

RESEARCH METHOD

1. Place and time of research

This research was carried out in March-April 2024 at SMP NU Palangkaraya which is located at Jalan RTA Milono Km 3 Palangkaraya.

2. Research methods

This research is a development that is in line with *Research & Development* with the ADDIE model which includes five stages including *analyze* , design, *develop* , *Implementation* and *Evaluation* which are shown in the following figure

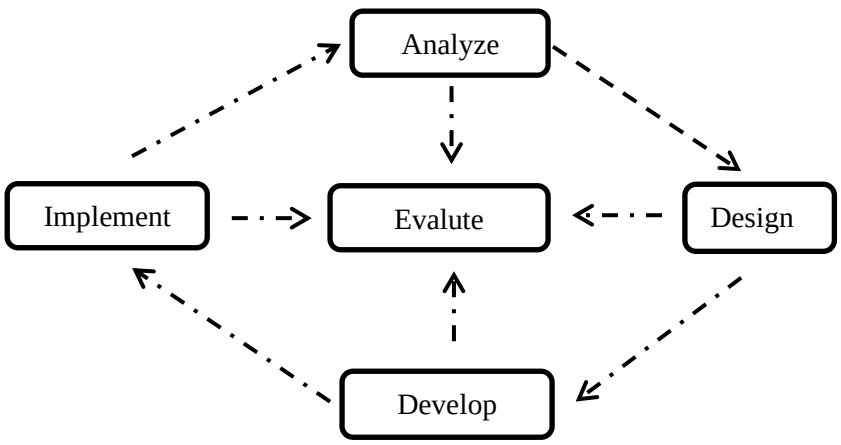


Figure 1. ADDIE Development Flow

3. Research Procedures and Instruments

Learning media was developed by applying the ADDIE model which consists of five stages. Observation and questionnaires were used as data collection methods. The content of the material, presentation steps, language used, format and relevance of the approach used are the points that will be assessed in the video being developed. This research uses data collection in the form of a needs analysis questionnaire, validation test questionnaire. Needs analysis data was obtained from 26 class VII students, validation test data was obtained from assessment of learning video media carried out by four lecturers as experts. The media validators consist of two lecturers, namely Jhelang Annovasho, S.Pd. M , Si . and Luvia Ranggi Nastiti, S.Si., M.Pd. and the material validator consisted of two lecturers as experts, namely Lilin Ika Nur Indahsari, S.Pd. M, Si. and Nurul Septiana, M.Pd who is a lecturer from IAIN Palangka Raya. A questionnaire is a way of collecting data by means of respondents being given a number of questions or written statements which the respondent must respond to (Sugiyono, 2017).

4. Data analysis

If the required data has been collected, ana.lysis will be carried out in the form of qualitative descriptive and quantitative descriptive

a) Video development procedures

At this stage the researcher carries out a qualitative descriptive analysis of the video that is being developed. This analysis provides information about media development procedures. The results of this analysis are used as the basis for updating and editing the product being developed.

b) Video compliance by experts

The feasibility test for the media being developed consists of an assessment by media experts and material experts. The feasibility test aims to assess the suitability of the product being developed as a learning medium. Validation tests were carried out to test the suitability of the material and readability aspects of the videos being developed. Assessment of the suitability of media and materials by experts is carried out using a questionnaire (Sugiyono, 2019).

Media assessment in the form of problem-based videos uses the following assessment scale.

Table 1. Guidelines for Determining Criteria

Scale	Answer Choices
1	Very less
2	Not enough
3	Enough
4	Good
5	Very good

(Sugiyono, 2019).

a. Calculate the average value of each aspect using the equation:

$$\bar{X} = \frac{\sum X}{N}$$

With:

$\bar{X}$ = Average score of assessments by experts

$\sum X$ = Total score obtained by the expert

N = Total score

b. Percentage score for each aspect

At this stage, the score data for assessing the validity of learning media is in the form of videos problem-based the calculated average value is converted into a percentage. The resulting percentage can be calculated using the following formula: (Arikunto, 2017)

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

With:

P = Percentage of eligibility
$\sum x$ = total score obtained
$\sum xi$= maximum total score

Determination of questionnaire score interpretation criteria can be seen in the following table:

Table 2. Guidelines for Determining Eligibility Categories

Percentage (%)	Eligibility criteria
81-100	Very Worth It
61-80	Worthy
41-60	Decent Enough
21-40	Not feasible
0-20	Totally Not Worth It

(Riduwan, 2015)

If the results of data analysis are recapitulated by validators consisting of media and material achieves very feasible (SL) or decent (L) results, then the media developed, namely problem-based videos , can be used. If it does not meet the expected quality of suitability, then the media developed must be revised again so that it has a quality that is suitable for students to use.

RESULTS AND DISCUSSION

1. Video Development

The following are the stages of developing learning video media using the ADDIE model:

a. *Analysis*

Needs analysis is the first step in this development research. The first stage, namely needs analysis, aims to find out what students' learning needs are. Researchers distributed needs analysis questionnaires to class VII SMP NU Palangkaraya

b. *Design*

After carrying out the analysis stage and knowing the students' learning needs , the next step is designing or planning the media. The steps taken in designing learning media in the form of problem- based science learning videos using the CapCut application.

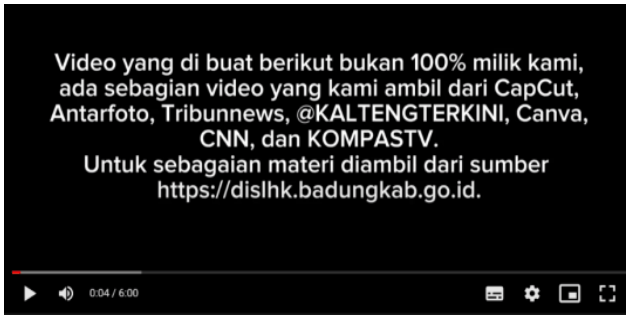


Figure 2 . Science Learning Videos

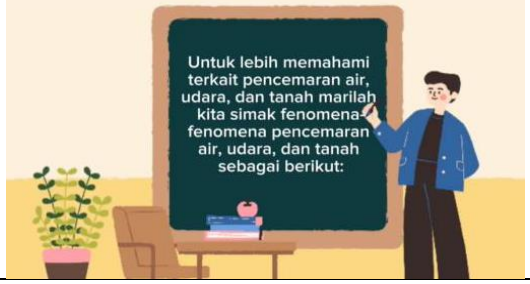
The researcher designed the development of learning media in the form of learning videos by designing the composition of environmental pollution material for class VII with the syllabus and adapting it to the video to be made. The learning video made consists of 1 video with a duration of 06.00 minutes. This media is made in video form in mp4 format and the language used in the video is Indonesian, accompanied by the use of several background sounds so that the learning video can entertain and attract students' attention to follow the lesson.

c. *Development*

At this stage, we are developing media in the form of learning videos. The steps taken at this stage are determining learning indicators that match the basic competencies in environmental pollution material with the curriculum used by the school where the research is located. Meanwhile, preparing learning video media namely as follows (Table 3).

Table 3. Display of Science Learning Videos

No	Part	Learning Video Display	Contents
1.	Opening		At the beginning of the video the researcher inserts a problem that will later be solved by the students, as well as providing stimulants so that students are more interested.
2.	Definition of Environmental Pollution		In this section the researcher explains the definition of environmental pollution and the types of environmental pollution.
3.	Description of Soil Pollution Material		In this section the researcher explains a problem in everyday life related to soil pollution and explains the impacts it causes.
4.	Description of Water Pollution Materials		In this section the researcher explains a problem in everyday life related to soil pollution and explains the impacts it causes.

No	Part	Learning Video Display	Contents
5.	Description of Air Pollution Materials		In this section the researcher explains a problem in everyday life related to soil pollution and explains the impacts it causes.
6.	Closing		In this section the researcher gives an assignment in the form of observations that will be carried out by the students, and the researcher excuses himself.

d. *Implementation*

The implementation stage in this research was carried out by validating video media learning to media experts and science material experts , which will then be tested on students on a small scale. This aims to get results or responses to the video media being developed. The development of this media is in the form of *soft files* , *namely* problem- based learning videos that can be accessed online and offline. Online, users or students can open the learning video on link following:

https://drive.google.com/file/d/1N2gssDAtIoUFbna3MmLVUj4EyjSZNZ6E/view?usp=drivesdk which can be opened using a cellphone, laptop or computer. Meanwhile offline, students can first download the learning videos available on the link, so they can be played offline.

e. *Evaluation*

Evaluation is carried out in the form of formative evaluation. The evaluation results are used to provide feedback to video users. Revisions are made according to the evaluation results or needs that cannot be met by the video.

2. Eligibility of Learning Video

The second stage is the *development process* by carrying out validity. Validation aims to determine the validity of the learning video media developed. Validation is directly assessed by experts, namely media experts and material experts. Validation results can be said to be high if the value obtained is equivalent to the validity provisions. The results obtained from this assessment are used as a reference to improve learning outcomes and students' understanding of environmental pollution material in learning. Learning videos can be said to be valid if they fall into the good category or very appropriate criteria (Ario & Asra, 2019). The assessment of learning video media was carried out by four lecturers as experts. The media validators consist of two lecturers, namely Jhelang Annovasho, S.Pd. M , Si . and Luvia Ranggi Nastiti, S.Sc., M.Pd. who is a lecturer from IAIN Palangka Raya to assess the suitability of the media being developed. The material validator consists of two lecturers as experts, namely Lilin Ika Nur Indahsari, S.Pd. M , Si . and Nurul Septiana, M.Pd who is a lecturer from IAIN Palangka Raya to assess science material on the content aspect, presentation aspect and language aspect.

The questionnaire was submitted to the material validator with aspects of learning content totaling thirty indicators. The questionnaire submitted to media experts on the display aspect consists of nine indicators. The suitability of the video by the material validator is shown in table 4 of the following recap.

Table 4 . Material Validator Recapitulation

Aspect	Number of Each Aspect	Maximum Score	Percentage	Category
Contents	100	140	71,43%	Worthy
Presentation	44	60	73,33%	Worthy
Language	78	100	78%	Worthy
Average			74,25%	Worthy

The results of the assessment carried out by material experts through three aspects are as follows:

1) Product feasibility in the content feasibility aspect received a percentage of 71.43 % which was in the feasible category.
2) Product feasibility in the presentation feasibility aspect received a percentage of 73.3 3% which was in the appropriate category.
3) Product feasibility in the language feasibility aspect received a percentage of 78 % which was in the feasible category.

Based on the assessment of the first and second material validators , it can be seen that the average percentage of assessments on learning videos is 74.25 % , which means that the learning videos developed are in the category suitable for use. Of the three aspects above, the content feasibility aspect gets the lowest percentage and the other two aspects get a higher percentage . In the two aspects that received the highest scores, the researcher used effective sentences, presented the video in a coherent manner, involved students, and was consistent in the use of terms and symbols. This is in accordance with research by Rahmawati (2018). This was made clear by Harahap (2022)that in good learning media there is conformity in the presentation of the material with the applicable curriculum and the questions presented are in accordance with the learning objectives. A recap of video suitability from media validators can be seen in the recapitulation table 5 following.

Table 5. Result of Validator Media

Aspect	Score of the Validator
Interest in packaging	9
Suitability of material appearance	9
The suitability of the image to the material	9
Match the sound to the image and material	9
Appropriate use of typeface	9
Appropriate use of color variations	9
Consistent use of voice	9
The attractiveness of the material and images	9
Accurate placement of sounds and images with the material	8
Total Score	80
Total Score Maximum	90
Results	88,9%
Category	Very Worth It

The results of the assessment carried out by media validators through nine aspects resulted in a percentage of 8 8.9 % in the very feasible category . This aspect includes:

1) four and five respectively (a total score of nine) and was the highest score given by the two validators. Researchers used *fonts* that did not have many combinations but were also not monotonous, used different *background sounds to attract more interest from those watching the video.* In accordance with Kurniawan's research (2018), the use of *fonts determines* the attractiveness of the appearance in the video proportionally so as to get the highest score.

2) The appropriateness of the presentation of the material in the learning video received four and five respectively (total score of nine).
3) The suitability of the image with the material in the learning video gets four and five respectively (total score of nine).
4) he suitability of the sound with the images and material in the learning video gets four and five respectively (total score of nine).
5) The suitability of the font used in the learning video gets four and five respectively (total score of nine).
6) The appropriateness of using color variations in the learning video received four and five respectively (total score of nine).
7) Consistency in the use of sound in learning videos gets four and five respectively (total score of nine).
8) The attractiveness of the material and images in the learning video received four and five respectively (total score of nine).
9) The accuracy of placing sound and images with the material in the learning video got the lowest score, each getting four (total score of eight), which means that this aspect can be improved further in the future.

Based on the assessment of the first and second media validators, it can be seen that the percentage of assessments on learning videos is 8 8.9 % , which means that the learning videos developed are in the very suitable category for use. This assessment shows that the video developed can help teachers in the learning process, this is reinforced by Krisnayanti & Wiarta (2022)that it is easier for teachers to teach mathematics subjects regarding the concept of circumference and area of a circle because it is supported by creative and easy to use learning media. The recapitulation of small group trial results is shown in the following table 6

Table 6. Students Responses

Aspect	Average Score	Percentage	Category	Criteria
Attractiveness	4,2	84%	Appropriate	Very interesting
Effectiveness	4,25	85%	Appropriate	Very effective
Average	4,2	84,5%	Appropriate	Very Interesting/Effective

The results of small group trials carried out by students received the following responses.

1) Responses to the attractiveness aspect which consists of five assessment items with a maximum score of 5 received an average score of 4.2 with a percentage of 84% in the appropriate category and very attractive criteria
2) Responses to the effectiveness aspect which consists of four assessment items with a maximum score of 5 received an average score of 4.25 with a percentage of 85% in the appropriate category and very effective criteria.

From the two aspects above, an average score of 4.2 was obtained with a percentage of 84.5%, which means that the learning video based on student responses is very interesting and effective to use. This is in line with previous research by Maylinda and Haryani (2021)which received positive responses from students , which means the media developed was effectively used during the learning process.

Referring to the data in the analysis of table 4 and table 5 , it shows that the feasibility of material validation is 3.7 with a percentage of 74.25 % and the media feasibility score is 4.4 with a percentage of 88.9%. This means that problem-based learning videos are being developed. based on aspects of the media and material in it, it can be categorized as "decent" based on criteria on a scale of 61% - 80% = worthy. This means that all aspects shown in the video are suitable for use during learning activities, both in form and content of the material contained therein. This is supported by previous research by (Kurniawan et al , 2018) which states that learning videos are suitable for use

in learning, so it is hoped that can support student understanding.

Learning videos developed and validated by experts can support the quality of learning, especially in environmental pollution material. The material expert's advice to researchers is to be able to highlight pollution in the surrounding area (Central Kalimantan), the background used by researchers should be more interesting or adapt the topic being raised (not just the background of curtains), there is the use of unclear terms, the rest of the media has been considered worthy . Comments from media validators are aspects that are conveyed to be clarified, other than that media has classified very worthy. This becomes a reference for researchers to revise learning media in the form of problem-based videos. Meanwhile, 26 students showed positive responses to both the attractiveness and effectiveness aspects, which means that the students felt helped by the development of video media.

CONCLUSION

Based on the results of the research developed, it can be concluded that Class VII Problem-Based Learning Videos on Environmental Pollution Material have met the existing criteria based on validation by media and material experts consisting of two experts each, as well as positive responses from students, so this problem-based learning video media is categorized as appropriate with a percentage of material validators of 74% and media validators 88.9%.

ACKNOWLEDGEMENTS

Thank you to all parties who have helped in completing this research, especially the Principal, Teachers, Staff and Students of NU Palangkaraya Middle School who have been willing to help and give permission in the process of collecting this data.

REFERENCES

Alawiyah, T., & Hasanah. (2022). Pengembangan Media Pembelajaran IPA Materi Kalor Dengan Menggunakan Video Animasi Berbasis Problem Based Learning pada Siswa Kelas V SD. *Lemkomindo, 2*(1), 3-4.

Ardianti, R., Sujarwanto, E., & Surahman, E. (2021). Problem-based Learning: Apa dan Bagaimana. *DIFFRACTION: Journal for Physics Education and Applied Physics, 3*(1), 27-35.

Yuliono, S. N., Sarwanto, & Wahyuningsih, D. (2014). Video Pembelajaran Berbasis Masalah. *Jurnal Pendidikan Fisika, 2*(1), 70-76.

Yuliono, S. N., Sarwanto, & Wahyuningsih, D. (2014). Video Pembelajaran Berbasis Masalah Pada Materi Kalor Untuk Siswa Kelas ViI. *Jurnal Pendidikan Fisika, 2*(1).

Aini, Q., Ningsih, K., & Wahyuni, E. S. (2023). Kelayakan Media Pembelajaran Biocard Pada Materi Sistem Pencernaan Kelas Viii Smpn 14 Pontianak. *Bioilmi: Jurnal Pendidikan, 9*(2), 71-72.

Ambarsari, W., Santosa S, & Maridi. (2013). Application of guided inquiry learning to science process skills. *journal of biological education, 5*(1), 81-95.

Anggreni, S., Kadek, N., Suniasih, & Wayan, N. (2021). Pengembangan Video Berbasis PBL Learning Materi Siklus Hidup Hewan pada Muatan IPA kelas IV Dauh Puri Kecamatan Denpasar Bali. *Jurnal Ilmiah Pendidikan Profesii Guru, 4*(2), 319-328.

Arikunto, S. (2017). *Pengembangan instrumen penelitian dan penilaian program.* Yogyakarta: Pustaka Pelajar.

Ario, M., & Asra, A. (2019). Pengembangan Video Pembelajaran Materi Integral. *Jurnal Program Studi Pendidikan Matematika, 8*(1), 20-31.

Faradisa, A. R., Fianti, S. I., Cristyanty, V., Yusuf, S. M., & Cahyani, V. P. (2021). Pengembangan Media Pembelajaran Interaktif Nearpod pada Materi Pencemaran Lingkungan untuk Peserta Didik Kelas VII SMP/MTs. *Proceeding of Integrative Science Education Seminar, 1*, 106-116.

Harahap, I. N., Nursamsu, & Setyoko. (2022). Pengembangan Modul Biologi Berbasis Guided Discovery Learning Pada Kelas Vii Smpn 13 Langsa. *Bioilmi: Jurnal Pendidikan, 9*(2), 1-12.

Krisnayanti, R., & Wiarta, I. W. (2022). Pengembangan Video Pembelajaran Animasi Berbasis Problem Based Learning pada Mata Pelajaran Matematika. *JOTE, 3*(3), 414-427.

Kurniawan, A. (2018). *Pengembangan Media Audio Visual Pada Pembelajaran Problem Based Learning Untuk Meningkatkan Hasil Belajar Kognitif Peserta Didik Kelas X SMA Negeri 7 Purworejo.* Yogyakarta: Universitas Negeri Yogyakarta.

Kurniawan, D. C., Kuswandi, D., & Husna, A. (2018). Pengembangan media video pembelajaran pada mata pelajaran IPA tentang sifat dan perubahan wujud benda kelas IVSDN Merjosari 5 Malang. *JINOTEP*, 119-125.

Maylinda, R., & Haryani, S. (2021). Kelayakan dan Kepraktisan Bahan Ajar Untuk Program Pengayaan Berbantuan Schoology Pada Materi Larutan Penyangga. *Chemistry in Education, 10*(1), 68-74.

Rahman, A., Munandar, S. A., Fitriani, A., Karlina, Y., & Yumriani. (2022). Pengertian Pendidikan, Ilmu Pendidikan Dan Unsur-Unsur Pendidikan. *Al Urwatul Wutsqa: Kajian Pendidikan Islam*, 1-8.

Rahmawati, A. (2018). *Pengembangan Multimedia Pembelajaran Interaktif Berbasis Lectora Inspire Menggunakan Model Problem Based Learning Pada Materi Alat-alat Optik Kelas XI.* Lampung: UIN Raden Intan.

Riduwan. (2015). *skala pengukuran variabel-variabel penelitian.* Bamdung: Alfabeta.

Shofiyah. (2018). Model Problem Based Learning (PBL) dalam Melatih Scientific Reasoning Siswa. *Jurnal Penelitian Pendidikan IPA, 3*(1), 33-38.

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D.* Bandung: Alfabeta.

Sugiyono. (2019). *Metode Penelitian Pendidikan (Kuantitatif, Kualitatif, Kombinasi, R&D dan Penelitian Pendidikan).* Bandung: Alfabeta.

Wedyawati, N., & Lisa, Y. (2019). *Pembelajaran IPA Di Sekolah Dasar.* Yogyakarta.

Wulandari, A. P., Salsabila, A. A., Cahyani, K., Nurazizah, T. S., & Ulfiah, Z. (2023). Pentingnya Media Pembelajaran dalam Proses Belajar Mengajar. *Journal on Education, 05*(02), 3929-3936.

Yulmasleli, Y. (2020). Peningkatan Hasil Belajar IPA Siswa Kelas IV dengan Menggunakan Pendekatan Kontruktivisme. *Jurnal Pendidikan Tambusai, 4*(1), 798-809.