



Development of Interactive Multimedia Based on Contextual Approach in Mathematics Learning to Improve Learning Outcomes of Elementary School Students

Pengembangan Multimedia Interaktif Berbasis Pendekatan Kontekstual pada Pembelajaran Matematika untuk Meningkatkan Hasil Belajar Siswa

^{*1}Tedy Putra, ²Titin Rahmayanti Rambe,
STKIP AL Maksu Langkat
tedyputra@stkipalmaksum.ac.id

Abstract

This research aims to develop interactive multimedia based on a contextual approach. This research is research and development. This research uses a 4-D development model which consists of four stages, namely define, design, develop, disseminate. However, this research only reached the development stage. The research was carried out at SD IT Bintang Langkat. The subjects in the research were 20 class IV students. The object in the research is interactive multimedia based on a contextual approach. The collection techniques used are observation, tests and questionnaires. Data analysis techniques are (a) feasibility analysis of interactive multimedia based on a contextual approach; (b) analysis of the effectiveness of interactive multimedia based on a contextual approach. Based on the results of expert validation carried out on interactive multimedia based on a contextual approach, the results of expert validation with a percentage of 92.80% are categorized as very feasible, the results of validation of language experts with a percentage of 80.00% are categorized as feasible, and the results of media expert validation with a percentage of 93.05% categorized as very feasible. The results in the pretest trial were 2 students who completed and 18 students who did not complete with a percentage of 45%, while in the posttest trial there were 19 students who completed and 1 student who did not complete with a percentage of 83%. Based on this description, it can be concluded that interactive multimedia based on a contextual approach is very feasible and effective for class IV students at SD IT Bintang Langkat.

Keywords: *interactive multimedia; contextual approach; mathematics learning; learning outcomes*

Abstrak

Penelitian ini bertujuan untuk mengembangkan multimedia interaktif berbasis pendekatan kontekstual. Penelitian ini merupakan penelitian dan pengembangan. Penelitian ini menggunakan model pengembangan 4-D yang terdiri dari yaitu define, design, develop, disseminate. Tetapi pada penelitian ini hanya sampai pada tahap develop. Penelitian dilaksanakan di SD IT Bintang Langkat. Subjek dalam penelitian yaitu siswa kelas IV yang berjumlah 20 siswa. Objek dalam penelitian yaitu multimedia interaktif berbasis pendekatan kontekstual. Teknik pengumpulan yang digunakan yaitu observasi, tes, dan angket. Teknik analisis data yaitu (1) analisis kelayakan multimedia interaktif berbasis pendekatan kontekstual; (b) analisis keefektifan multimedia interaktif berbasis pendekatan kontekstual. Berdasarkan hasil validasi ahli yang dilakukan pada multimedia interaktif berbasis pendekatan kontekstual bahwa hasil validasi ahli dengan persentase 92,80% dikategorikan sangat layak, hasil validasi ahli bahasa dengan persentase 80,00% dikategorikan layak, dan hasil validasi ahli media dengan persentase 93,05% dikategorikan sangat layak. Hasil pada ujicoba pretest siswa yang tuntas

sebanyak 2 siswa dan yang tidak tuntas sebanyak 18 siswa dengan persentase sebesar 45%, sedangkan pada ujicoba posttest siswa yang tuntas sebanyak 19 siswa dan yang tidak tuntas sebanyak 1 siswa dengan persentase sebesar 83%. Berdasarkan uraian tersebut, dapat disimpulkan bahwa multimedia interaktif berbasis pendekatan kontekstual sangat layak dan efektif yang siswa kelas IV di SD IT Bintang Langkat.

Kata Kunci: multimedia interaktif; pendekatan kontekstual; pembelajaran matematika; hasil belajar

©Pedagogic Journal of Islamic Elementary School. This is an open access article under the [Creative Commons - Attribution-ShareAlike 4.0 International license \(CC BY-SA 4.0\)](#)

Introduction

Nowadays, education requires teachers to be able to create and develop learning media as a support in the learning process. Using learning media will make students more interested in participating in the learning process, learning will be more meaningful for each student because it will achieve learning goals. This is in line with Ningsih et al (2023) who say that by students using learning media, lessons can be made more fun for them and they can learn independently, making learning more meaningful and helping students achieve better learning goals. This is also supported by Syawaluddin et al., (2020) who say that learning media helps the communication process between teachers and students to become smoother.

In creating and developing learning media, teachers can utilize technology in the learning process. Because currently, technology is closely related to people's daily lives. Technology that can support the learning process as a learning medium this is in line with Irawan et al (2023) who said that the Era of Society 5.0 marks very rapid technological development, where technology has become an inseparable part of everyday life.

Based on observations made by researchers on class IV teachers at SD IT Bintang Langkat, it is known that teachers are less capable in creating and developing learning media, students are less interested in participating in teaching and learning activities in the classroom, students do not understand the learning material explained by the teacher, this also has an impact on low student learning outcomes.

One learning media that teachers can use to solve problems in class IV is by using interactive multimedia learning media. Interactive multimedia is the use of various types of media that can enable users to contribute to the media (Silalahi et al., 2023). Meanwhile, Saputra & Alexon (2023) say that Interactive multimedia is a combination of various media from computers, video, audio, images and text. According to Rasmani et al (2023), the advantage of interactive multimedia learning is that it makes it easier for teachers to use technology in learning in accordance with current developments.

Teachers can also use interactive multimedia through a contextual approach. Rahmayani et al (2015) said contextual learning is a method that helps teachers connect what they teach with real world conditions and empowers students to draw connections between the knowledge they have and its use in everyday life. According to Sugandi &

Bernard (2018) there are seven main components of a contextual approach including: constructivism, inquiry, questioning, learning community, modeling, reflection and authentic assessment. Meanwhile, according to the 2002 DIKNAS, there are seven components, namely: (a) Constructivism/Countructivism, (b) Questioning, (c) Finding or Inquiry, (d) Learning Community, (e) Modeling, (f) Reflection, and finally (g) Authentic Assessment. Even though these components and indicators are a reference for design in learning, sometimes not all of these principles are shown. So the learning indicators that will appear are only those that are needed according to the situation in the field.

The use of interactive multimedia based on a contextual approach can be used by teachers in mathematics learning. Mathematics is an important knowledge for students to have which is useful in solving problems in everyday life (Muhammad & Junaidi, 2023). This is in line with Sari et al (2023) who say that learning mathematics is one of the most important subjects for students to study because at every level of education in Indonesia mathematics is studied very much. The aim of studying mathematics is to form and develop a systematic, logical, critical, creative and consistent way of thinking, as well as being able to develop a firm and confident attitude towards problem solving (Prihandoko in Rizko et al., 2023). Mathematics lessons are difficult because these lessons contain the concept of number science, the relationship between a number and operational steps to be able to solve number problems that are related to a number (Sarah et al., 2021).

Based on the description above, researchers are interested in conducting research entitled "Development of Interactive Multimedia Based on a Contextual Approach to Mathematics Learning to Improve Student Learning Outcomes".

Method

This type of research is research and development. The research uses a 4-D development model which consists of four stages: Define, Design, Develop Disseminate stages (Wijayanti et al., 2023). However, this research only reached the development stage. The research was carried out at SD IT Bintang Langkat. The subjects in the research were 20 class IV students. The object in the research is interactive multimedia based on a contextual approach. The collection techniques used are observation, tests and

questionnaires. Data analysis techniques are (1) feasibility analysis of interactive multimedia based on a contextual approach; (b) analysis of the effectiveness of interactive multimedia based on a contextual approach.

Table 1. Likert Scale (Rahayu et all, 2023)

No	Answer	Score
1	Strongly agree	5
2	Agree	4
3	Doubtful	3
4	Don't agree	2
5	Strongly disagree	1

The formula used to measure the feasibility of interactive multimedia based on a contextual approach is as follows (Muhyiddiin et al., 2023):

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

Information:

P = Percentage

$\sum xi$ = total score from validators

$\sum x$ = Maximum total score

To measure the results of validation that has been carried out on interactive multimedia based on a contextual approach, you can use the feasibility test percentage scale in the table below:

Table 2. Feasibility Test Percentage Scale (Juliana & Sulistyowati, 2023)

No	Score	Classification
1	81% - 100%	Very Worth It
2	61% - 80%	Worthy
3	41% - 60%	Decent Enough
4	21% - 40%	Not feasible
5	0% - 20%	Totally Not Worth It

To measure the results of the effectiveness of interactive multimedia based on a contextual approach, you can use the following formula from student learning outcomes in mathematics learning (Yudatama et al., 2023):

$$\text{Effectiveness} = \frac{\text{total skor}}{\text{skor maksimal}} \times 100\%$$

Results and Discussion

This research is research and development. This research will develop interactive multimedia based on a contextual approach. This research uses a 4-D development

model which consists of the define, design, develop disseminate stages. However, this research only reached the development stage. The stages in this research are as follows:

Define

At this stage, researchers will carry out definitions aimed at determining the learning needs of teachers and students in mathematics learning. To support a learning process that is tailored to needs, researchers will pay attention to the curriculum used, student characteristics, learning materials and student learning outcomes. After researchers know the needs of teachers and students, researchers will develop a product that can support the mathematics learning process in the classroom.

Design

At this stage the researcher will design a product. The product to be developed is interactive multimedia based on a contextual approach. The product developed will be validated by 3 experts, namely material experts, language experts and media experts. Validation will later receive suggestions and input from experts with the aim of making interactive multimedia based on a contextual approach suitable for use.

Development

At this stage, the researcher has finished designing interactive multimedia based on a contextual approach. Next, researchers will validate the product with 3 experts, namely media experts, language experts and material experts. When carrying out validation, the product being developed receives several suggestions and input provided by experts. After receiving suggestions and input, the researchers then improved the product developed in accordance with the directions of the experts. After improving the product developed, the researcher validated it again with the experts, after validating the product developed, namely interactive multimedia based on a contextual approach, was suitable for use. The results of the validation carried out by experts can be seen in the following table:

Table 3. Expert Validation Results on Interactive Multimedia Based Contextual Approach

No	Validation	Percentage	Criteria
1	Materials Expert	92.80%	Very Worth It
2	Linguist	80.00%	Worthy
3	Media Expert	93.05%	Very Worth It

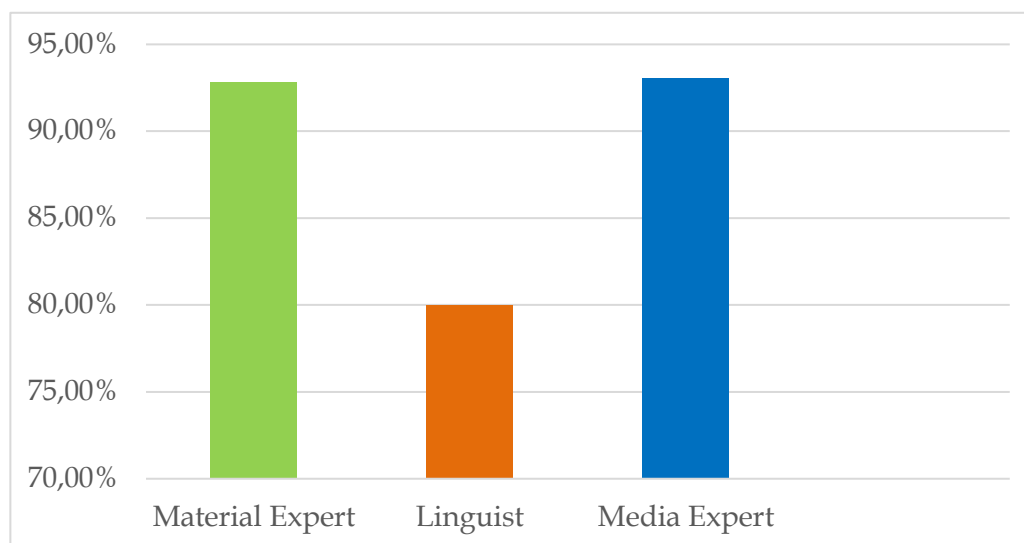


Figure 1. Expert Validation Results on Interactive Multimedia Based Contextual Approach

Based on table 3 and figure 1 above, it is known that the results of expert validation carried out on interactive multimedia based on a contextual approach show that the results of expert validation with a percentage of 92.80% are categorized as very feasible, the results of expert validation with a percentage of 80.00% are categorized as feasible, and media expert validation results with a percentage of 93.05% were categorized as very feasible. Based on these results, it can be concluded that interactive multimedia based on a contextual approach is suitable for use at SD IT Bintang Langkat.

After completing validation with language experts, media experts and material experts and it has been declared suitable for use. Then, researchers will conduct trials. This trial aims to see improvements in student learning outcomes by using interactive multimedia based on a contextual approach to mathematics learning. This trial was carried out in two stages, namely pretest and posttest. The results of the pretest and posttest trials can be seen in table 4 and figure 2 below:

Table 4. Pretest and Posttest Results for Class IV Students at SD IT Langkat Star

No	Student's	Pretest	Criteria	Posttest	Criteria
1	R1	30	Not Completed	70	Complete
2	R2	50	Not Completed	80	Complete
3	R3	40	Not Completed	90	Complete
4	R4	80	Complete	90	Complete
5	R5	20	Not Completed	80	Complete
6	R6	60	Not Completed	90	Complete
7	R7	40	Not Completed	90	Complete
8	R8	50	Not Completed	80	Complete
9	R9	70	Complete	90	Complete
10	R10	10	Not Completed	60	Not Completed
11	R11	40	Not Completed	80	Complete
12	R12	60	Not Completed	90	Complete
13	R13	30	Not Completed	70	Complete
14	R14	50	Not Completed	90	Complete
15	R15	40	Not Completed	80	Complete
16	R16	20	Not Completed	90	Complete
17	R17	40	Not Completed	80	Complete
18	R18	50	Not Completed	90	Complete
19	R19	70	Complete	100	Complete
20	R20	60	Not Completed	80	Complete
Amount		910		1670	
Percentage		45%		83%	

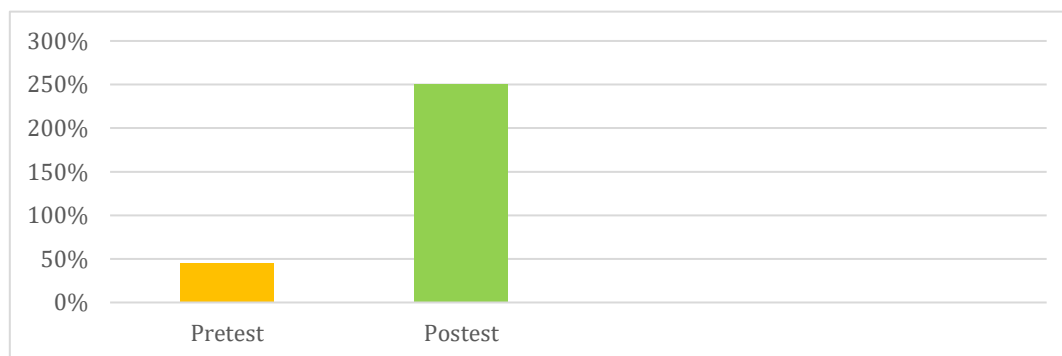


Figure 2. Pretest and Posttest Results for Class IV Students at SD IT Langkat Star

Based on table 4 and figure 2 above, it is known that in the pretest trial, 2 students completed the test and 18 students did not complete it with a percentage of 45%, while in the posttest trial, 19 students completed the test and 1 student did not complete it. percentage of 83%. Based on this description, it can be concluded that the use of

interactive multimedia based on a contextual approach is effective for grade IV students at SD IT Bintang Langkat.

Discussion

This research develops interactive multimedia based on a contextual approach to mathematics learning, which has been validated by material experts, language experts and media experts. The product developed, namely interactive multimedia based on a contextual approach, has been tested on grade IV students at SD IT Bintang Langkat, by conducting pretest and posttest trials.

Based on table 3 and figure 1 above, it is known that the results of expert validation carried out on interactive multimedia based on a contextual approach show that the results of expert validation with a percentage of 92.80% are categorized as very feasible. This is in line with research Novianti & Lubis (2023) say that 97% and is in the very decent category. Linguist validation results with a percentage of 80.00% are categorized as adequate. This is in line with research by Lubis et al (2023) say that 85.71% is categorized as very feasible. And the media expert validation results with a percentage of 93.05% are categorized as very feasible. This is in line with Parinduri et all (2022) said that media experts with a percentage of 89% were categorized as very qualified. Based on these results, it can be concluded that interactive multimedia based on a contextual approach is suitable for use at SD IT Bintang Langkat.

Based on table 4 and figure 2 above, it is known that in the pretest trial, 2 students completed the test and 18 students did not complete it with a percentage of 45%, while in the posttest trial, 19 students completed the test and 1 student did not complete it. percentage of 83%. This is in line with research by Suryaman & Suryanti (2022) said that the results of the pretest were 20% and the posttest were 80%. Based on this description, it can be concluded that the use of interactive multimedia based on a contextual approach is effective for grade IV students at SD IT Bintang Langkat.

Previous research that supports this research includes that conducted by Layyin & Haqiqi (2022) said that interactive multimedia learning media based on Adobe Flash in integrated corner material with Islamic values is declared feasible to support the learning process. These results were obtained from validation by media and material experts as well as student trials whose results were in the very feasible category.

Nugroho et al (2023) said that the use of interactive multimedia is very effective for elementary school students to use. Putri & Hamimah (2023) said that learning media in the form of interactive multimedia in class IV elementary schools is declared valid, practical and effective for use in the learning process. Harun & Fitria (2020) said the use of interactive multimedia in the learning process can create a more practical and efficient atmosphere in learning. So that active students can be active in the learning process.

Based on the results and discussion in this research, it can be concluded that interactive multimedia based on a contextual approach is very feasible and effective for class IV students at SD IT Bintang Langkat.

Conclusion

This research is research and development. The research uses a 4-D development model which consists of four stages: Define, Design, Develop Disseminate stages. However, this research only reached the development stage. The research will develop interactive multimedia based on a contextual approach.

Based on the results of expert validation carried out on interactive multimedia based on a contextual approach, the results of expert validation with a percentage of 92.80% are categorized as very feasible, the results of validation of language experts with a percentage of 80.00% are categorized as feasible, and the results of media expert validation with a percentage of 93.05% categorized as very feasible. The results in the pretest trial were 2 students who completed and 18 students who did not complete with a percentage of 45%, while in the posttest trial there were 19 students who completed and 1 student who did not complete with a percentage of 83%.

Based on the results and discussion in this research, it can be concluded that interactive multimedia based on a contextual approach is very feasible and effective for class IV students at SD IT Bintang Langkat.

Reference

- Irawan, E., Kusumah, YS, & Saputri, V. (2023). Interactive Multimedia Development Using Scratch: Learning Solutions in the Era of Society 5.0. *AKSIOMA: Journal of the Mathematics Education Study Program*, 12(1).
- Harun, GJ, & Fitria, Y. (2023). Interactive Multimedia Design Assisted by Adobe Flash CS6 Software for Class V Elementary School Students. *e-Journal of Elementary School Learning Innovation*, 10(2), 236-247.

- Juliana, I., & Sulistyowati, R. (2023). Development of an interactive e-module based on the book creator application for creative products and entrepreneurship subjects for class XII BDP SMK PGRI 13 Surabaya. *Journal of Economic Education (JUPE)*, 11(3), 328-334.
- Layyin, SNM, & Haqiqi, AK (2023, January). Development of Interactive Multimedia Learning Media Based on Adobe Flash on Integrated Islamic Values Material. In *NCOINS: National Conference Of Islamic Natural Science* (Vol. 2, No. 1, pp. 95-109).
- Lubis, RR, Rambe, N., Azhar, PC, Sugma, AR, & Franklin, TND (2023). Development of Digital-Based Smart Card Learning Media to Improve the Learning Outcomes of Madrasah Ibtidaiyah Students. *MUDARRISA: Journal of Islamic Education Studies*, 15(1), 1-24.
- Lubis, R.R., Dwiningrum, S.I.A., & Zubaidah, E. (2023). Pengembangan Video Animasi Powtoon Dalam Pembelajaran Bahasa Indonesia Untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar. *Jurnal Ilmu Komputer, Teknologi Informasi dan Teknik Telekomunikasi*, 4(2), 427-433.
- Ningsih, S., Susilo, TAB, & Dewi, AS (2023). Development of Interactive Multimedia Articulate Storyline in Thematic Material for Class V Elementary School. *Pendas: Scientific Journal of Basic Education*, 8(2), 1823-1838.
- Novianti, Y., & Lubis, RR (2023). Development of Audiovisual Based E-Modules in Increasing the Learning Independence of Elementary School Students in Stabat District. *Genta Mulia Journal*, 14(1).
- Nugroho, W., Rilianti, AP, & Wijanarko, T. (2023). Development of Interactive Multimedia in Science Learning in Elementary Schools. *Journal of Primary Education*, 1(01).
- Muhyiddin, R., Hutahaean, SD, & Hartanto, TJ (2023). Development of Infographic-Based Handout Learning Media to Improve Students' Scientific Literacy Abilities on Global Warming Material in Class VII SMP. *Bahana Pendidikan: Journal of Science Education*, 5(1), 1-6.
- Muhammad, I., & Juandi, D. (2023). Discovery Learning Model in Middle School Mathematics Learning: A Bibliometric Review. *EULER: Scientific Journal of Mathematics, Science and Technology*, 11(1), 74-88.
- Parinduri, WM, Lubis, RR, Rambe, TR, & Rambe, N. Development of Flipbook Based Smart Card Learning Media in Science Learning to Improve Student Learning Motivation for Class III Elementary School. *School Education Journal PGSD FIP Unimed*, 12(3).
- Putri, NM, & Hamimah, H. (2023). Development of Interactive Multimedia Wordwall Using the Problem Based Learning (PBL) Model in Science Learning. *Journal of Practice Learning and Educational Development*, 3(1), 95-99.
- Rahayu, ED, Widyaningrum, HK, & Yanto, ENA (2023, July). Development of Articulate Storyline Interactive Media in Thematic Learning for Grade 5 Elementary Schools. In *National Seminar on SOCIAL, Science, Education, Humanities (Senassdra)* (Vol. 2, No. 2, pp. 817-827).

- Rahmayani, F., Hindun, I., & Hudha, AM (2015). Development of contextual-based handouts in biology lessons on biotechnology material for class XII students at SMK Negeri 02 Batu. *JPBI (Indonesian Journal of Biology Education)*, 1(1).
- Rasmani, UEE, Wahyuningsih, S., Nurjanah, NE, Jumiatmoko, J., Widiastuti, YKW, & Agustina, P. (2023). Interactive Learning Multimedia for PAUD Teachers. *Journal of Obsession: Journal of Early Childhood Education*, 7(1), 10-16.
- Rizko, U., Islam, M.H., & Badruttamam, CA (2023). Implementation of Caseme P3 in Mathematics Lessons by Using Used Items as Learning Media. *Attadrib: Journal of Madrasah Ibtidaiyah Teacher Education*, 6(1), 21-30.
- Saputra, RY (2023). Android-Based Interactive Multimedia Development to Increase Learning Independence. *Dyadic: Scientific Journal of Educational Technology*, 13(1), 48-59.
- Sarah, C., I Nyoman, K., & Awal, N. (2021). Factors That Influence Students' Interest in Learning in Mathematics Subjects in Cluster III Cakranegara. *Journal of Educational Progress*, 2(1).
- Sari, NH, Anita, IW, & Maesyaroh, E. (2023). Application of a contextual approach to improve critical thinking skills on relationship and function material. *JPMI (Journal of Innovative Mathematics Learning)*, 6(2), 685-692.
- Silalahi, HEG, Slamet, A., & Anwar, Y. (2023). Development of Interactive Multimedia Based on Google Sites in Class XI High School Biology Learning. *Journal of Biology Learning: Biology Studies and Learning*, 10(1).
- Sugandi, AI, & Bernard, M. (2018). Application of a Contextual Approach to Mathematical Understanding and Communication Abilities of Middle School Students. *Journal of Analysis*, 4(1), 16-23.
<https://doi.org/10.15575/ja.v4i1.2364>
- Suryaman, S., & Suryanti, Y. (2022). Development of animated video media based on plotagon and capcut to improve cognitive learning outcomes for grade II elementary school students. *Cakrawala Pendas Journal*, 8(3), 841-850.
- Syawaluddin, A., Afriani Rachman, S., & Khaerunnisa. (2020). Developing Snake Ladder Game Learning Media to Increase Students' Interest and Learning Outcomes on Social Studies in Elementary School. *Simulation & Gaming*, 51(4), 432-442.
<https://doi.org/10.1177/1046878120921902>
- Wijayanti, LS, Koto, I., & Winarni, EW (2023). Development of Interactive Multimedia with Inquiry-Based Examples and Non-Examples in Science Learning Material on Animal Digestive Organs for Class V Students. *Journal of Elementary Education Learning and Teaching*, 6(1), 75-87.
- Yudatama, B., Jaya, A., & Prasrihamni, M. (2023). Development of Weather Box Learning Media in Theme V Class III of SD Negeri 90 Palembang. *Journal on Teacher Education*, 5(1), 224-234.