



POP-UP BOOK DEVELOPMENT: A LEARNING MEDIA TO REDUCE FOOD LOSS AND FOOD WASTE IN JUNIOR HIGH SCHOOL STUDENTS

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Abstract

The development of interesting learning media needs to be done to attract students' interest. Food loss and food waste are quite serious problems because the effects of food loss and food waste are very detrimental to humans. One of the learning media that can be developed as an educational effort related to the problem of food waste and food loss, namely pop-up books. The purpose of this study was to determine the results of the validity, effectiveness, and practicality of pop-up books to train students to reduce food loss and food waste. The research design used research and design (R&D). The participants in this study were class VII in one of the Surabaya city junior high schools in the Even Semester 2021/2022. The instruments used in the study, namely: feasibility test instruments for media experts, media feasibility test instruments for material experts, food loss and food waste literacy questions, and response questionnaires. Data collection techniques, namely: written tests, observations and surveys with paper & pencil. Data analysis techniques for validity use a Likert scale by finding the average, effectiveness is analyzed using Normalized change, and practicality is analyzed using a response questionnaire by finding the percentage of each indicator. The results of this study, material expert validators obtained a percentage of 90% and media expert validators obtained a percentage of 93%. The effectiveness of this media obtained a score of $<c> = 0.67$ with the interpretation of moderate improvement. The practicality of this media obtained a percentage of 93% with a very good interpretation. Pop-up book food loss and waste is a feasible media to be used in learning to train and reduce food loss and food waste.

Keywords: Pop-up Book, Food Loss, Food Waste

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INTRODUCTION

One of the current global challenges is environmental issues. This is reinforced by the opinion of (Al-Anwari, 2014) that environmental problems are not a new problem but the same as the age of this earth, which according to experts is about five billion years old. In relation to environmental issues Parfitt et al, (2010) argues that the issue of food loss and waste is a problem that continues to grow in line with the increasing human population in the world and is strengthened by the influence of the globalization process. Food loss and waste are two different conditions, where food loss is food that is "lost" during the production to distribution process. Food loss here can be interpreted as a loss of food that is lost both in quality and quantity. While food waste is food that is wasted and then becomes waste, this condition usually occurs at the consumption stage. Most of the wasted food is still suitable for further production or human consumption and is enough to feed the 821 million people in the world who are still experiencing hunger and malnutrition (FAO, 2017).

The issue of food waste and food loss cannot be separated from the role of generation Z and the current millennial generation, some environmental activists argue that globalization has led to an increase in product consumption, which has an impact on the environment. Globalization creates a global trend that never happened before. Due to rapidly integrated information networks, the consumption trends of the global community have changed. Food trends that occur in one country can be followed by other countries, thus increasing the consumption of the global community, including generation Z and millennials.

The importance of education related to environmental issues to generation Z and millennials, who on average are still in school, can affect the formation of environmental awareness character. Formal education is an effective tool in character building (Kemendikbudristek, 2022). Students can have positive habits intensively through school. Education is a favored place for character building in facing global challenges (Rokhman et al., 2014). One of the characters that has a big impact is caring for the environment. There are several things that can affect the character of caring for the environment in the form of learning media used by teachers during the teaching and learning process with the science-educational approach (Fakhriyah, 2014).

Education related to food loss and food waste can be done through science literacy activities. Science literacy seeks to increase knowledge on environmental phenomena through science studies in students. The government has pursued science

literacy activities through the program "Gerakan Literasi Sains Nasional" with the hope of improving science literacy skills in students. However, science literacy activities at school still rarely explain material related to food loss and food waste. This is reinforced by the opinion of Aqil (2017) that 90% of school learning uses textbooks in 90% of the learning time allocation. This is one of the reasons why food loss and food waste are not taught in schools, due to the fact that school science textbooks do not cover the material related to food loss and food waste in detail. So that additional teaching materials or learning media are needed to support food loss and food waste education in schools. The use of appropriate learning media can improve learning efficiency because the use of creative media can facilitate communication in learning, provide interesting learning experiences, and will increase student motivation (Yanto et al., 2023).

One of the learning media that can be developed as an educational effort related to the problem of food waste and food loss is the Pop-up book. Pop-up book is a 3-dimensional book-shaped media that when opened, the inside opens and gives a real impression (Mustika & Ain, 2020). Pop-up book media can develop creativity and make it easier for students to capture meaning through interesting image representation. In addition, pop-up book also raises the desire to read (Yanto et al., 2023). Pop-up book is a book that has moving parts or has three-dimensional elements and provides a more interesting visualization of the story, starting from the appearance of images that can move when the page is opened (Dzuanda, 2011). The unique visualization of this pop-up book can stimulate students to learn, develop their capacity, and facilitate students to remember the material in the book (Nurhanifah et al., 2020)

One of the previous studies related to pop-up book development was conducted by Septiana et al, (2021). Based on this research, the quality of pop-up book media has obtained very good quality. This means that the quality of the media has fulfilled 5 aspects of good assessment, namely, content, language, presentation, overall appearance and science literacy. The formulation of the problem in this study is how the validity, effectiveness, and practicality of pop-up books to train students to reduce food waste and food waste. The purpose of this study was to determine the results of the validity, effectiveness, and practicality of pop-up books to train students to reduce food loss and food waste. The update of this research is the material used about food loss and food waste that no one has developed.

METHOD

Research Design

The research design used research and design (R&D), This method requires stages in research (Sugiyono, 2014). Self-development research means producing a product to be tested and measured for feasibility as shown in Figure 1.

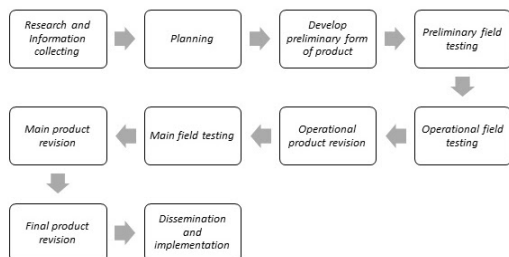


Figure 1. R&D stages

This research is limited to the final product revision stage. This development was conducted for only one school. Procedures have been simplified due to time, energy and cost constraints.

Research Objectives

The participants involved in this study were grade VII in one of the junior high schools in Surabaya city in the Even Semester 2021/2022. The technique of taking participants in this study was carried out by considering certain criteria in accordance with the research objectives. The inclusion criteria in this study were seventh grade students while the exclusion criteria in this study were students who did not attend class. All participating students have filled in the consent. After that, all the data that has been collected is then analyzed according to the regulation of research data.

Instrument

The instruments used in this study, namely: (1) feasibility test instrument for media experts, (2) media feasibility test instrument for material experts, (3) food loss and food waste literacy questions, and (4) response questionnaire for students. Indicators for the media expert feasibility test instrument can be seen in Table 1.

Table 1. Media expert's feasibility test indicators

No	Aspect	Indicators
1	Material Feasibility	Accuracy of material with basic competencies and
		Clarity of material
		Correctness of the
		Material actualization
		Coverage of material
		Clarity of instructions for use

No	Aspect	Indicators
2	Language Feasibility	Clarity of language use
		Ease of use Language
		Delivery of material according to the characteristics of
		Interesting material delivery
		Coherent delivery of material
3	Delivery Material	Learning engages students
		Quality of material delivery
		Media can be used by individuals or groups

Indicators for the feasibility test instrument for material experts can be seen in Table 2.

Table 2. Material expert feasibility test indicators

No	Aspect	Indicator
1	Physical Attractiveness	Physical quality of the media
2	View	Shape and size
		Cover design
		Colors and fonts
		Language Usage
3	Learning	Image quality
		Relevance to the material

The indicators of food loss and food waste literacy questions can be seen in Table 3.

Table 3. Indicators of literacy questions about food loss and food waste

No	Indicator
1.	Implementing a zero waste lifestyle towards food loss and food waste
2.	Shopping plan to reduce food loss and food waste
3.	Interesting activities in utilizing food loss and food waste

The indicators for the response questionnaire can be seen in Table 4.

Table 4. Response questionnaire indicators

No	Aspect	Indicator
1	Media quality	Easy to use media
		Media can be used independently
2	Quality of material	The material is easy to
		Presentation of interesting

No	Aspect	Indicator
3	Technical quality	Use of language
		Increase learning motivation
		Instructions for use are clear
		Font selection
		Suitability of letters
		Color suitability
		Attractive image display

Data Collection Technique

Data collection techniques in the study, namely: written tests, observations and surveys by means of paper & pencil. The written test method is given before and after the teaching and learning process to see the initial and final scores. Written tests are closed and the time allocation is 45 minutes for each pretest and post-test. Observations used in data collection are observations from media, material, and language experts. Media, material, and language experts from two lecturers of science study program FMIPA UNESA. The survey used in data collection is a questionnaire for students' responses. The survey for the response questionnaire was carried out offline and closed with an allocation of 25 minutes for students to work on.

Analysis Technique

After all the data has been collected, the data is analyzed as follows:

- 1) Test the validity of the pop-up book
Test the validity of the pop-up book using data from 2 experts using a Likert scale by finding the average of the expert's assessment.
- 2) Test the effectiveness of the pop-up book
After completing the pretest and posttest, the data obtained was then analyzed using *Normalized change* ($<c>$). $<c>$ used to analyze the results of science literacy on food loss and food waste of students. Interpretation of $<c>$ if the post-test value > pretest then the same criteria will be used as *Normalized Gain* ($<g>$) courtesy of Hake (1998) can be seen in the Table 5.

Table 5. Interpretation $<g>$

Scores	Interpretation
$<g> > 0.70$	High
$0.30 \geq <g> \leq 0.70$	Medium
$<g> \leq 0.30$	Low

Marx & Cummings (2007) created $<c>$ to overcome the disadvantages of $<g>$, which is that it has a low test score bias and produces a non-symmetrical score range that makes interpretation difficult in some cases.

3) Practicality test of pop-up book

The pop-up book practicality test was conducted using a student response questionnaire to collect data on student responses to pop-up book learning media after being applied in the learning process using a Likert scale. Furthermore, the data that has been obtained is analyzed using Equation 1.

$$P = \frac{A}{B} \times 100\% \quad (1)$$

Note:

A = Proportion of students choosing
B = Number of respondents (students)
P = Student response percentage

The results of the response questionnaire then go through the average percentage on each indicator to find out the criteria. After calculating the index value of each statement and obtaining the results, then compare the results of the index value in Table 6.

Table 6. Percentage of response questionnaire criteria

Percentage (%)	Interpretation
$0 \leq P < 21$	Very Bad
$21 \leq P < 41$	Bad
$41 \leq P < 61$	Good enough
$61 \leq P < 81$	Good
$81 \leq P \leq 100$	Very good

RESULTS AND DISCUSSION

The research data obtained, namely: the validity of pop-up book media, the effectiveness proven by test questions about food loss and food waste, and student response questionnaire. The data that has been obtained will then be discussed in this study. The development of pop-up book food loss and food waste learning media was measured using research instruments, namely, validity tests, pretest and posttest literacy questions about food loss and food waste in the form of multiple choice and descriptions, and response questionnaires.

The results of the validity of the material experts and media experts can be seen in Table 7.

Table 7. Results of validation by material experts

No	Aspect	Score	Interpretation
1	The content of the material is in accordance with SK and KD	4	Good
2	Material content is easy to understand	5	Very Good

No	Aspect	Score	Interpretation
3	The content of the material is in accordance with the concept	5	Very Good
4	Actual material	4	Good
5	Coverage of material	4	Good
6	Instructions for using the media are clear	3	Enough
7	The use of language is clear and in accordance with the Refined Spelling (EYD)	5	Very Good
8	The language used is easy to understand	5	Very Good
9	Delivery of material according to student characteristics	5	Very Good
10	Material delivery is interesting	5	Very Good
11	Material delivery is presented coherently	4	Good
12	Learning is interesting for students	5	Very Good
13	Quality of material delivery	4	Good
14	Media can be used by individuals or groups	5	Very Good
Average		4.5	
Percentage		90%	

Based on Table 7, it can be seen that the average percentage is 90% with a very good interpretation. The input from expert validators, namely: it is necessary to add instructions for using the media at the beginning and instructions for working on questions. The input from the expert validator was then followed up by revising the design first before printing. The results of the media expert validation can be seen in Table 8.

Table 8. Media expert validation results

No	Aspect	Score	Interpretation
1	The composition and layout of the text on the cover is balanced	5	Very Good
2	Title and background colors are appropriate	5	Very Good
3	The instructions for using the media are clear	5	Very Good
4	The size of the printing paper is appropriate	5	Very Good
5	The size and type of font used are proportional	5	Very Good

No	Aspect	Score	Interpretation
6	The letters used are clear and easy to read	5	Very Good
7	The colors chosen are in accordance with the characteristics of students	5	Very Good
8	The color of the letters with the background is right	5	Very Good
9	Attractive color selection	5	Very Good
10	Language used is clear & easy to understand	4	Good
11	Language style according to EYD	5	Very Good
12	Interesting storyline	3	Enough
13	The images used are of high quality	5	Very Good
14	The picture is neat	5	Very Good
15	Images can help students understand the material	3	Enough
16	Interesting media	4	Good
17	The media is relevant to the subject matter	5	Very Good
18	Quality pop-up book material	5	Very Good
Average		4.6	
Percentage		93%	

Based on Table 8, it can be seen that the overall average score is 93% with a very good interpretation. The input from expert validators, namely: examples of pictures made real and writing must be in accordance with general guidelines for Indonesian spelling. The input from the validator was then followed up by revising the design before going to the printing stage. Based on the results of the expert validators, it can be concluded that the pop-up book food loss and waste media is suitable for use. Mode after completing the revision of the pop-up book food loss and waste media, the printed results can be seen in Figure 2 and Figure 3.

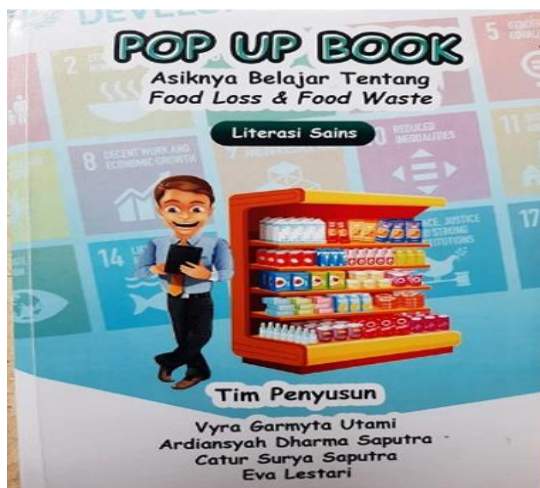


Figure 2. Cover pop-up book

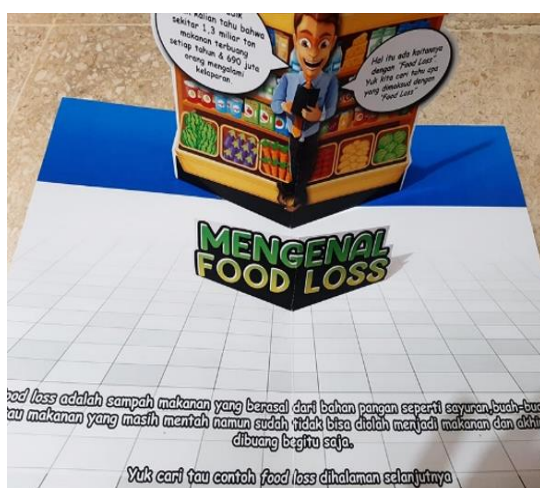


Figure 3. Content pop up-book food loss and waste

The pop-up book food loss and waste media that has been printed then the media is tested on students. Before treatment, students are first given a pretest question to determine the initial ability of students. After doing the pretest, students are given treatment with pop-up book food loss and waste media and then at the end of the learning, posttest questions are given to determine the final ability of students. The results of the scores from the pretest and posttest of students can be seen in Figure 4.

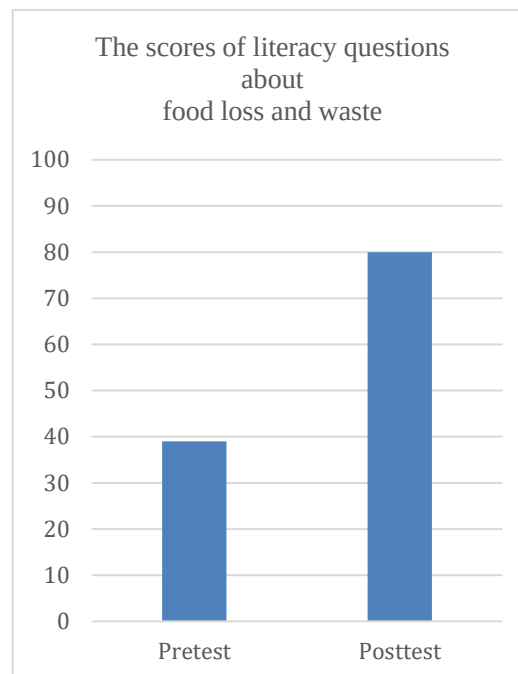


Figure 4. Pretest and posttest scores

Based on Figure 4, it can be seen that the average pretest and posttest scores have a difference. The pretest score obtained a score of 39, while the posttest score obtained a score of 80. The pretest and posttest scores were then analyzed using t with the results of the score $t = 0.67$ with moderate interpretation. The t results from students show that students' knowledge has increased after using pop-up book food loss and waste media. This can happen because the pop-up book food loss and waste media has an attractive appearance so that it can impress and motivate students to learn (Ulfa & Nasryah, 2020). The learning process and learners' enthusiasm can be seen in Figure 5.



Figure 5. Learners use pop-up book food loss and waste

Based on Figure 5, it can be seen that students are learning using pop-up books in groups. Junior high school students still need concrete and interesting media so that students are not easily bored when learning (Slavin, 2018). The results of students' responses to the pop-up book media can be seen in Table 9.

Table 9. Response questionnaire percentage

No	Indikator	Persentase (%)	Interpretasi
1	Media quality	90	Very Good
2	Quality of material	93	Very Good
3	Technical quality	96	Very Good

Based on Table 9, it can be seen that students gave a very good response to the pop-up book food loss and waste media. This can be seen from the average of each indicator obtaining a score of 93% with very good interpretation. The technical indicator obtained the highest percentage because the pop-up book media according to students was very attractive in terms of appearance, color, and font selection. The results of this learner response questionnaire can conclude that the pop-up book food loss and waste media is easy to use, the material is very interesting, and the results are very good, easy to understand, and attractive in appearance or design.

The utilization of appropriate learning media such as pop-up books can attract students' interest in the learning process and clarify the understanding of the material (Liando et al., 2022; Marhamah et al., 2022). Pop-up book is one of the strategies in effective and interactive learning because it gives students opportunities to engage in teaching and learning activities, adds fresh experiences to everyday activities, and describes information visually (Harahap et al., 2023; Mungallamah & Saifuddin, 2021; Sukmawati, 2021). According to Fauziyah & Mulyani, (2024), learning media designed with high attractiveness such as pop-up books can provide learning motivation to students and facilitate the process of understanding the subject matter. The existence of this media in learning is expected to be able to foster students' interest and desire to deepen their understanding of materials and experiences (Shoimah, 2020). In accordance with this, pop-up book can be utilized to provide students with knowledge regarding food loss and waste material.

Food loss and waste material is necessary to acquire as it has a direct bearing on Indonesia's capacity to preserve its food supply in light of the nation's ongoing struggles with hunger and poverty (Nizmi et al., 2023). A change in community behavior is one of the Bappenas policy suggestions that has been implemented to minimize food loss and waste (Bappenas, 2021). In Indonesian public schools, students are trained to separate garbage based on its type. Nevertheless, little is known about the processing of the waste cycle, which results in food loss and waste (Lasmaria, 2023). Things that have been done to reduce food loss and waste with behavior change strategies in students are socialization (Nizmi et al., 2023; Priatna, 2023), campaigns (Lasmaria, 2023; Pranata et al., 2022; Sasmita et al., 2024), and training (Purba et al., 2023). Furthermore, the pop-up book on food loss and waste media can help students develop a considerate attitude toward the environment, which is crucial in this day and age. Research has shown that employing pop-up books about food loss and waste has improved students' understanding of these topics.

CONCLUSIONS AND SUGGESTIONS

Conclusion

This research can be concluded that pop-up book food loss and waste media can be used to train and reduce food loss and food waste. Pop-up book food loss and waste from expert validation obtained a very good interpretation and is suitable for use. In terms of effectiveness, this media is effective for practicing food loss and food waste because it obtained a <c> value with moderate improvement. This media is also practical to use based on the response questionnaire obtained very good results which means it is easy and practical to use.

Suggestion

This study was limited to a limited product test due to limited time and research costs. Further research needs to be done related to mass product trials to find out whether the results are consistent.

REFERENCES

- Al-Anwari, A. M. (2014). Strategi pembentukan karakter peduli lingkungan di sekolah adiwiyata mandiri. *Ta'dib: Jurnal Pendidikan Islam*, 19(2). <https://doi.org/10.19109/td.v19i02.16>
- Aqil, D. I. (2017). Literasi sains sebagai konsep pembelajaran buku ajar biologi di sekolah. *Wacana Didaktika*, 5(02), 160–171. <https://doi.org/10.31102/wacanadidaktika.5.02.160-171>
- Bappenas. (2021). Food Loss and Food Waste di Indonesia dalam Rangka Mendukung

- Penerapan Ekonomi Sirkular dan Pembangunan Rendah Karbon.
- Dzuanda, B. (2011). Perancangan buku cerita anak pop – up tokoh – tokoh wayang seri “Gatotkaca.” Institut Teknologi Sepuluh Nopember.
- Fakhriyah, F. (2014). Penerapan problem based learning dalam upaya mengembangkan kemampuan berpikir kritis mahasiswa. *Jurnal Pendidikan IPA Indonesia*, 3(1), 95–101.
<https://doi.org/10.15294/jpii.v3i1.2906>
- Fauziyah, D. H., & Mulyani, P. K. (2024). Development and evaluation of a digital pop-up book on the concept of force for fourth-grade science. *Jurnal Penelitian Pendidikan IPA*, 10(7), 3721–3730.
<https://doi.org/10.29303/jppipa.v10i7.7770>
- Food and Agriculture Organization of the United Nations. (2017). The state of food and agriculture: Leveraging food systems for inclusive rural transformation. FAO publisher. www.fao.org/publications
- Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses. *American Journal of Physics*, 66(1), 64–74.
<https://doi.org/10.1119/1.18809>
- Harahap, N., Afrida, J., & Aida, N. (2023). Desain Pop Up Book Sebagai Media Pembelajaran Pada Materi Tata Surya di SMP/MTs. *Desultanah (Journal Education and Social Science)*, 1(1), 14–28.
<https://journal.desultanah.com/index.php/desultanah/article/view/4>
- Kementerian Pendidikan Kebudayaan Riset dan Teknologi. (2022). Presentasi sosialisasi kurikulum merdeka. Jakarta : Kemendikbud.
<https://kurikulum.kemdikbud.go.id/kurikulum-merdeka/>
- Lasmaria, J. (2023). Perancangan Kampanye Kreasikan Sisa Makananmu Dalam Rangka Mengurangi Food Waste. Institut Teknologi Sepuluh Nopember.
- Liando, N. V. F., Tatipang, D. P., Tamboto, G., Poluan, M., & Manuas, M. (2022). Pictures as a learning media in teaching vocabulary. *Jurnal Ilmiah Universitas Batanghari Jambi*, 22(3), 1944.
<https://doi.org/10.33087/jiubj.v22i3.2832>
- Marhamah, F., Muslem, A., & Marhaban, S. (2022). An investigation on using teaching media in teaching speaking skill. *English Education Journal*, 13(1), 32–45.
<https://doi.org/10.24815/eej.v13i1.23147>
- Marx, J. D., & Cummings, K. (2007). Normalized change. *American Journal of Physics*, 75(1), 87–91.
<https://doi.org/10.1119/1.2372468>
- Mungallamah, D., & Saifuddin, M. F. (2021). Pengembangan Media Pop-up Book Materi Kingdom Animalia untuk Siswa Sekolah Menengah Pertama. *Journal of Learning and Instructional Studies*, 1(1), 25–36.
<https://doi.org/10.46637/jlis.v1i1.4>
- Mustika, D., & Ain, S. Q. (2020). Peningkatan kreativitas mahasiswa menggunakan model project based learning dalam pembuatan media IPA berbentuk pop up book. *Jurnal Basicedu*, 4(4), 1167–1175.
<https://doi.org/10.31004/basicedu.v4i4.518>
- Nizmi, Y. E., Sarikusumaningtyas, W., Hasibuan, A. I. R. S., & Mandataris, M. (2023). Edukasi dan Sosialisasi Perubahan Perilaku Pada Peserta Didik Jenjang Pendidikan Sekolah Dasar Sebagai Upaya Strategi Penerapan Perilaku Nonfood Waste di Indonesia. *Madaniya*, 4(3), 1238–1245.
<https://doi.org/10.53696/27214834.550>
- Nurhanifah, N., Hamdiyati, Y., & Sanjaya, Y. (2020). Pengaruh demonstrasi penggunaan buku pop up sebagai media pembelajaran terhadap motivasi dan penguasaan konsep siswa pada materi sistem endokrin. *Assimilation: Indonesian Journal of Biology Education*, 3(2), 69–73.
<https://doi.org/10.17509/aijbe.v3i2.28483>
- Parfitt, J., Barthel, M., & Macnaughton, S. (2010). Food waste within food supply chains: quantification and potential for change to 2050. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365(1554), 3065–3081.
<https://doi.org/10.1098/rstb.2010.0126>
- Priatna, A. (2023). Sosialisasi Isu Food Waste Lewat Cergam Edukatif “Boni dan Makanan.” *Jurnal Pengabdian Kepada Masyarakat*, 3(1), 10–22.
<https://doi.org/10.46961/JPK.V3I1.720>
- Pranata, S., Yuliatin, Basariah, & Zubair, M. (2022). Implementasi Program Zero Waste untuk Membentuk Warga Negara Ekologis (Studi Kasus Upaya Pengelolaan Sampah di SMA Negeri 1 Mataram). *Journal of Classroom Action Research*, 4(4).
<https://doi.org/10.29303/JCAR.V4I4.2257>
- Purba, L. H. P. S., Kristiawan, Y. A., Pirena, K., & Nugroho, A. (2023). Pelatihan Pengolahan Sampah Sisa Sayur dan Buah Menjadi Eco-Enzyme. *Jurnal Abditani*, 6(2), 119–123.
<https://doi.org/10.31970/ABDITANI.V6I2.251>

- Rokhman, F., Hum, M., Syaifudin, A., & Yuliati. (2014). Character education for golden generation 2045 (National character building for Indonesian golden years). *Procedia - Social and Behavioral Sciences*, 141, 1161–1165. <https://doi.org/10.1016/j.sbspro.2014.05.197>
- Adhyanti, Sasmita, H., & Ayu Hartini, D. (2024). Kampanye Zero Food Waste dan Isi Piringku di Sekolah Menengah Atas Kota Palu Sulawesi Tengah. *Jurnal Pengabdian Masyarakat: Svasta Harena*, 3(2), 39–43. <https://doi.org/10.33860/JPMSH.V3I2.3213>
- Septiana, A. W., Natalina, M., & Darmadi. (2021). Development of media pop up book based on science literation on excretion system materials of class VIII junior high school students. *JOM FKIP-UR*, 8(1), 1–9.
- Shoimah, R. N. (2020). Penggunaan media pembelajaran konkrit untuk meningkatkan aktifitas belajar dan pemahaman konsep pecahan mata pelajaran matematika siswa kelas III Mi Ma'arif NU Sukodadi-Lamongan. *MIDA : Jurnal Pendidikan Dasar Islam*, 3(1), 1–18. <https://doi.org/10.52166/mida.v3i1.1836>
- Slavin, Robert. E. (2018). Educational psychology. In *Psychological Bulletin* (Vol. 17, Issue 11). Johns Hopkins University. <https://doi.org/10.1037/h0071574>
- Sugiyono. (2014). *Metode penelitian pendidikan pendekatan kuantitatif, kualitatif, dan R&D*. Alfabeta.
- Sukmawarti, E. (2021). Pengembangan Media Pop Up Book Pada Pembelajaran PKN di SD. *Ability: Journal of Education and Social Analysis*, 2(4), 110–122. <https://doi.org/10.51178/JESA.V2I4.321>
- Ulfa, M. S., & Nasryah, C. E. (2020). Pengembangan media pembelajaran pop-up book untuk meningkatkan motivasi belajar siswa kelas IV SD. *Jurnal Ilmiah Pendidikan*, 1. <https://doi.org/10.51276/edu.v1i1.44>
- Yanto, N., GH, M., & Zubair, S. (2023). The effect of pop up book media in science learning: A literature review. *EduLine: Journal of Education and Learning Innovation*, 3(2), 214–220. <https://doi.org/10.35877/454RI.eduline1772>