ALGEBRA : JURNAL PENDIDIKAN, SOSIAL DAN SAINS

ISSN : 2807-663X e-ISSN : 2807-629X
Journal Homepage : https://algebra.yana.or.id/index.php/ejournal/index
Volume 5 Number 4 (2025)

DEVELOPMENT OF FLASH CARD LEARNING MEDIA ON THE MATERIAL OF THE BODY'S DEFENSE SYSTEM FOR 11TH GRADE HIGH SCHOOL STUDENTS

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ABSTRACT

The problems found in biology learning in several schools in Pekanbaru are that students find it difficult to understand the material on the body's defense system, learning media are not varied and interactive, and the majority of students have a visual learning style, so learning media that can facilitate this learning style are needed. The material on the body's defense system is difficult to see directly and contains scientific terms that are difficult to understand. The development of learning media with attractive visualizations is a solution to these problems. The purpose of this study was to produce valid and high-quality flash card learning media on the immune system for 11th grade high school students. This study was conducted at the Biology Education Study Program, Faculty of Teacher Training and Education, University of Riau and SMA Negeri 8 Pekanbaru from January to June 2025. The type of research used was Research & Development (R&D) using the ADDIE model. This research was only carried out up to the development stage. The validation results showed a very valid category with an average score of 3.82. The results of limited trials I and II showed a very valid category with average scores of 3.87 and 3.89. The quality of the flash card learning media was assessed based on the average results of the validation and limited trials. The quality results showed an average score of 3.86 with a very good category. It can be concluded that the flash card learning media on the subject of the body's defense system has very valid validity and very good quality, making it suitable for use in biology learning.

Keywords: Flash Card, Learning Media, Body Defense System

INTRODUCTION

Learning media is one of the most important components that can support the teaching and learning process. Learning media facilitates communication and interaction between teachers and students. Material that is difficult to explain verbally and is abstract in nature can be overcome with learning media (Hasan *et al.*, 2021). Based on interviews with several biology teachers from several schools in Pekanbaru, it was found that the learning media used were not very varied and interactive, generally only using *PowerPoint* and videos. The majority of students have a visual learning style and find it difficult to understand the material on the body's defense system because it is abstract and involves complex processes. One of the materials on the body's defense system, namely phagocytic cells and immunoglobulins, is difficult to observe directly and has confusing terms (Pertiwi *et al.*, 2024). In addition, ineffective learning time causes the material on the body's defense system not to be taught in depth, which impacts students' understanding. A solution to overcome these problems is through learning media. Learning media can overcome communication and time barriers (Kusuma *et al.*, 2023).

The development of *flash card* learning media is one solution that can overcome existing problems. *Flash cards* consist of two sides containing letters, numbers, words, sentences, symbols, or images that are used as tools to recognize, understand, remember, and teach specific information contained on them (Akbar, 2022). *Flash cards* are usually 8 x 12 cm in size or can be adjusted to the needs or desires of the developer. The presentation of images and informative text on *flash cards* can make it easier for students to understand the material. Abstract material can be presented through visualization on *flash card* learning media. Learners' understanding of abstract material can be improved through *flash cards* (Saputri & Lisdiana, 2025). Scientific names or terms can also be presented through *flash cards* (Mustaqimah *et al.*, 2023). *Flash cards* can train the right brain to remember images and words presented on *the flash cards (*Nasution & Tambunan, 2024). In addition, *flash cards* can generate interest and enjoyment in learning, develop memory, and promote independent learning (Wicaksana & Anityasari, 2020). The visual learning style of students can be accommodated through *flash card* learning media. Students with a visual learning style will tend to use their sight (Ermawati *et al.*, 2024). The images and text presented on *flash cards* can meet the needs of this learning style. Overall, this study aims to develop valid and high- quality flash card learning media on the subject of the body's defense system. Through this study, it is hoped that students will understand the subject of the body's defense system, provide more varied and interactive biology learning media innovations, and meet the visual learning styles of students.

RESEARCH METHODS

This study uses a *research and development* (R&D) type of research to produce *flash card* learning media on the subject of the body's defense system. The flow of *flash card* learning media development uses the ADDIE model, which consists of *analysis*, *development*, design, *implementation*, and *evaluation*. This study only reached the *development* stage. The analysis stage included curriculum analysis, student analysis, and media analysis. The design stage included the design of learning tools, the design of *flash card* learning media, and the design of data collection instruments, including validation sheets and user responses. The development stage included the development of learning tools and the development of *flash card* learning media. The developed *flash card* learning media underwent a validation and limited trial phase, resulting in *flash card* learning media on the subject of the body's defense system that is suitable for use in biology learning. In the validation phase, the material and media were validated by Biology Education lecturers at the University of Riau and biology teachers at SMA Negeri 8 Pekanbaru and SMA Negeri 7 Pekanbaru. The limited trial phase was conducted twice with different respondents. Limited trial 1 was conducted with 10 respondents who were Biology Education students at the University of Riau. Limited trial II was conducted with 20 respondents who were 11th grade students at SMA Negeri 8 Pekanbaru.

Data collection instruments use validation sheets given to validators and user response sheets in limited trials given to students and learners. The validation and user response sheets contain aspects to be assessed. The aspects on the validation sheet include content, language, presentation, the effect of media on learning strategies, and overall display suitability. Meanwhile, the user response sheet contains operational aspects, learning materials, interest and motivation, comfort and enjoyment, overall display suitability, and visual communication . Data analysis of the validation and limited trial results was conducted using a Likert scale of 1-4. The average scores of the validation

and limited trials I and II were interpreted based on the criteria shown in Table 1. The data obtained from the validation and limited trial scores were analyzed using the average score formula, namely:

$$\mathbf{M = \frac{\sum Fx}{N}}$$

Explanation:
M = Average score
Fx = Score obtained
N = Number of validation components

Table 1. Validity Criteria for *Flash Card* Learning Media

No	Criteria	Category
1	Highly Valid	3,25 < x ≤ 4
2	Valid	2,5 < x ≤ 3,25
3	Less Valid	1,75 < x ≤ 2,5
4	Not Valid	1 ≤ x ≤ 1,75

(Source: Sugiyono, 2016)

Flash card learning media that has been validated and tested in limited trials I and II, the quality value is then determined using the average score formula, namely:

$$\mathbf{\overline{X} = \frac{\sum \overline{X}1 + \sum \overline{X}2 + \sum \overline{X}3}{3}}$$

Explanation:
X = average score (*mean*)
X1 = average validation score
X2 = average value of limited trial I results
X3 = average score from limited trial II

The quality of learning media is derived from the average of the validation results and limited trials I and II. The criteria for determining the quality of *flash card* learning media for the immune system can be seen in Table 2 below:

Table 2. Criteria for the Quality of *Flash Card* Learning Media

No	Criteria	Category
1	Very Good	3,25 < x ≤ 4
2	Good	2,5 < x ≤ 3,25
3	Less Good	1,75 < x ≤ 2,5
4	Not Good	1 ≤ x ≤ 1,75

(Source: Sugiyono, 2016)

RESULTS AND DISCUSSION

Research on the development of *flash card* learning media on the subject of the body's defense system was conducted through the stages of analysis, design, and development. These stages were carried out sequentially and continuously to produce *flash card* learning media that is suitable for use in biology lessons.

Analysis Stage

The analysis stage consisted of analyzing the curriculum, media, and students. The curriculum analysis was carried out by analyzing the learning outcomes in the independent curriculum. The learning outcomes for the body's defense system can be seen in phase F, namely at the end of phase F, where students are able to understand the relationship between organ structure and organ systems and their functions in responding to internal and external stimuli. Learning outcomes can be formulated in learning objectives that enable the achievement of competence, conceptual understanding, and content in students (Eppendi *et al.,* 2024). The media developed is based on the learning objectives that have been set so that it contributes to the achievement of CP. Media analysis

is carried out to determine the need for learning media in biology learning at school. The pre-survey results show that the learning media used by teachers are generally only *PowerPoint* and videos. The *PowerPoint* and video media used are taken from *platforms* and sites that are provided and frequently used. The learning media that are often used by teachers without any variation tend to make students feel bored and unfocused (Tamboo *et al.*, 2024). *PowerPoint* is generally only used as a presentation tool that contains material but is less effective in encouraging student engagement (Setiawan & Septian, 2025).

An analysis of students was conducted to determine the characteristics of the students who were the target of the development of *flash card* learning media. Student characteristics can be seen from their learning styles and cognitive development (Estari, 2020). The results of a preliminary survey through teacher interviews found that the majority of students had a visual learning style. Students will rely more on their sight in receiving and processing the information presented (Budi et al., 2021). *Flash cards* are a suitable medium for students with visual learning styles because they present interesting images and information. Grade XI students have entered the formal operational stage of cognitive development. Based on Piaget's theory of cognitive development, the formal operational stage students are able to do various things systematically, think, weigh, and relate abstract concepts (Nainggolan & Deli, 2021). This ability can be strengthened through the use of *flash cards* that present visual displays of abstract material and relate them systematically so as to strengthen conceptual understanding and higher-level thinking.

***Design* Stage**

In the design stage, learning tools, *flash card* learning media, and data collection instruments were designed. The results of the learning tool design included the learning objective flow (ATP) and teaching modules. The learning objectives flow (ATP) contains the distribution of learning objectives for each meeting and learning activity. Through the learning objectives flow, teachers can develop learning steps based on learning outcomes (Wahyudin *et al.*, 2024). The teaching module contains more detailed learning activity guidelines for one meeting, which includes learning activities, assessments, enrichment, remediation, assignment sheets, and reading materials. Teachers can manage learning systematically to produce effective learning and improve learning outcomes (Gea & Laoli, 2025). Next, *flash card* learning media were designed. The *flash card* learning media were designed using the Canva application. In general, flash cards consist of two sides containing images and information. The designed *flash card* media contain main and supporting components. The main components include 1) material cards containing material that has been adapted to the learning objectives, 2) *quiz* cards containing questions and answers, 3) user instructions containing how to use the cards accompanied by symbols, 4) learning objectives, and 5) a table of contents. Supporting components include a cover, which is the outer part that functions as packaging to protect the cards. The design of data collection instruments includes , validation sheets, and user responses. The validation sheets and user responses contain aspects, indicators, and assessment rubrics that serve as a reference in scoring the questionnaire sheets. Assessment using validation sheets and response questionnaires can ensure that the developed media is suitable for use (Diraysidi *et al.*, 2024).

Development Stage

The learning tools, validation sheets, user response sheets, and *flash card* learning media that had been designed were developed into products that were ready for use. The *flash card* learning media was developed into 3 sets of cards. Each set of cards contains material for one meeting. Meeting one contains material on the functions of the body's defense system and the non-specific body defense system. Meeting two contains material on the specific body defense system. Meeting three contains material on types of immunity, immunization, factors, and disorders of the body's defense system. The following are the results of the development of *flash card* learning media on the material of the body's defense system.

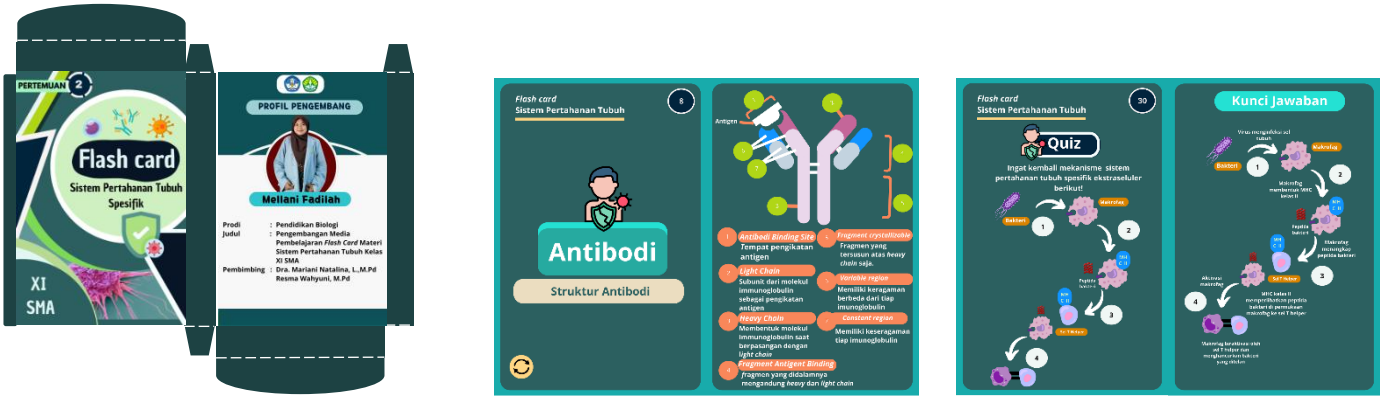

Figure 1. Display of Flash Card Learning Media on the Immune System

The developed *flash card* learning media was then validated by validators. The aspects assessed during the validation stage included content, language, presentation, the effect of the media on learning strategies, and overall display suitability. The average validation results for the flash card learning media across all aspects can be seen in Table 3 below.

Table 3. Overall Validation Results

No	Aspect	Average	Description
1.	Content Suitability Aspect	3,74	Highly Valid
2.	Linguistic Aspects	3,97	Highly Valid
3.	Presentation Aspect	3,97	Highly Valid
4.	Media Effect Aspect on Learning Strategy	3,72	Highly Valid
5.	Aspect of Overall Display Feasibility	3,73	Highly Valid
	Average	**3,82**	**Highly Valid**

The table above shows that the validation results for *flash card* learning media are in the highly valid category with an average score of 3.82. The aspects with the highest average scores are language and presentation, with an average score of 3.97 in the highly valid category. In terms of language, the language used in *flash card* learning media is presented clearly, correctly, and in accordance with the students' level of thinking. The content of *flash cards* can be conveyed well if the language used is clear and correct. According to Tamboo *et al.* (2024), the use of clear and correct language makes it easier for students to understand the information presented. In addition, the use of language that is adjusted to the level of thinking makes it easier for students to understand the concepts presented. This is in line with the opinion of Hutauruk (2022), who states that the meaning contained in learning media can be understood by students if the media is adjusted to their level of thinking ability.

In terms of presentation, the material on *flash cards* is presented in a sequential and systematic manner, from basic to advanced concepts. This helps build a complete and structured understanding in students. Learners will easily understand the material by mastering the basic concepts before studying the advanced concepts. According to Mustaqimah *et al.* (2023), *flash cards* that present material from simple to complex, concrete to abstract, can improve the learning process and quality of learning outcomes for learners. *Flash cards* present *quizzes* to reinforce concept understanding. The quiz on *flash cards* is titled "Remember" and is accompanied by answers that encourage students to measure their understanding of the material by recalling the material that has been presented. According to Rochaendi *et al.* (2024), the practice questions on learning media help students to continue practicing and strengthening their knowledge independently. Students can also be actively involved in learning. The presentation of *flash cards* in the form of images and information encourages students to look for material on the cards, creating an interactive and interesting atmosphere (Sarnia *et al.*, 2024). Students can understand and remember the material on the cards so that they are more enthusiastic about learning, do not feel bored by just listening to the teacher's explanation, and this has an effect on improving learning outcomes. According to Puriasih *et al.* (2023), *flash cards* increase student learning activities and learning outcomes. Valid *flash card* learning media can be tested on a limited basis with students. The results of limited tests I and II can be seen in Table 4 below.

Table 4. Results of Limited Trials I and II

No	Aspect	Average		Description
		Limited Trial I	Limited Trial II	
1.	Operational Aspect	3,86	3,90	Highly Valid
2.	Learning Material Aspects	3,80	3,92	Highly Valid
3.	Interest and Motivation Aspects	3,95	3,87	Highly Valid
4.	Comfort and Enjoyment Aspects	3,93	3,86	Highly Valid
5.	Overall Display Suitability Aspects	3,73	3,87	Highly Valid
6.	Visual Communication Aspect	3,96	3,93	Highly Valid
Average		**3,87**	**3,89**	**Highly Valid**

Based on the table above, it can be seen that the results of limited trials I and II on *flash card* learning media are in the highly valid category with average scores of 3.87 and 3.89. The aspect with the highest average score was visual communication with average scores of 3.96 and 3.93 in the highly valid category. *Flash cards* contain images and information that are designed to be as attractive as possible and help students understand the material presented. According to Muhammad & Laelasari (2025), the combination of images and text on *flash cards* makes the information conveyed quickly understandable. This is in line with the students' responses, which stated that "The use *of flash cards* is very helpful in understanding the material. This media is very interesting because it is practical, visual-based, and easy to use." *Flash cards* contain *"Visual* Imagery" which is effective in providing memory codes to easily recognize and remember the images and text presented (Sirih *et al.*, 2023). In limited trial I, the aspects of interest and motivation obtained the second highest average score of 3.95 with a category of very valid. The attractive appearance of *flash cards* makes students interested and motivated to learn. Students who are highly motivated will be happy and not easily bored during learning (Setyawan & Ibrahim, 2019). In limited trial II, the learning material aspect obtained the second highest average score of 3.92 with a very valid category. The material was presented in the form of important points through pictures and information that made it easy for students to understand the material. The presentation of material on *flash cards* only contained brief information so that students could easily remember the messages presented (Arman, 2019). This is in line with the students' responses, who stated that "*Flash cards* help with learning because they are very interesting, accompanied by pictures, and contain core material that is easy to understand." Furthermore, the quality of *the flash card* learning media can be seen based on the average validation results and limited trials. The quality of *the flash card* learning media can be seen in Table 5 below.

Table 5. Quality of *Flash Card* Learning Media

No	Aspect	Average	Description
1.	Validation	3,82	Very Good
2.	Limited Trial I	3,87	Very Good
3.	Limited Trial II	3,89	Very Good
Average		**3,86**	**Very Good**

Based on the table above, it can be seen that *flash card* learning media has a very good quality category with an average score of 3.86. *Flash card* learning media on the subject of the body's defense system is of sufficient quality to be used in biology lessons. Quality media can influence conceptual understanding, especially on the subject of the body's defense system, which was previously difficult for students to understand. Students who have a good understanding of the concepts will have an impact on improving learning outcomes. According to Sarnia *et al.* (2024), *flash card* media affects student learning outcomes by presenting illustrated material, making it easier to master the material.

CONCLUSIONS

Based on the results of the study, it can be concluded that the *flash card* learning media developed for the immune system material has high validity and excellent quality based on the results of validation and limited trials. The results of the overall validation show a very valid category with aspects assessed including content, language, presentation, the effect of media on learning strategies, and overall display feasibility. The results of limited trial I and limited trial II show a highly valid category with aspects assessed including operational aspects, learning materials, interest and motivation, comfort and enjoyment, overall display feasibility, and visual communication. The *flash*

card learning media developed can be used in biology learning. Valid and high-quality *flash card* learning media are suitable for use in biology learning.

BIBLIOGRAPHY

Akbar, Muhammad. (2022). *Flash card sebagai Media Pembelajaran dan Penelitian*. Haura Utama: Bima

Arman. (2019). *Media Flash card*. Goresan Pena:Sindangjawa

Budi, S. S., Suhaili, N., & Irdamurni, I. (2021). Konsep gaya belajar dan implementasinya pada proses pembelajaran. *Journal of Educational and Learning Studies*, 4(2), 232-236. https://doi.org/10.32698/01992

Diraysidi, H., Hidayati, A., & Syafril, S. (2024). Pengembangan Media Pembelajaran Interaktif Berbasis Android pada Mata Pelajaran Biologi Kelas XI di SMA. *Journal of Pedagogy and Online Learning*, 3(2), 28-38. https://doi.org/10.24036/jpol.v1i2.25

Eppendi, J., Ilham, M., Vega, N. D., & Borneo, U. (2024). Analisis Proses Perumusan CP: Merdeka Mengajar. Edu Cendikia: *Jurnal Ilmiah Kependidikan*, 4(2), 327-338. https://doi.org/10.47709/educendikia.v4i02.4455

Ermawati, E., & Usman, A. (2024). Analisis gaya belajar siswa dalam upaya mengimplementasikan pembelajaran berdiferensiasi kelas X2. *Jurnal Teknologi Pendidikan*, 1(4), 9-9. https://doi.org/10.47134/jtp.v1i4.91

Estari, A. W. (2020). Pentingnya memahami karakteristik peserta didik dalam proses pembelajaran. *In Social, Humanities, and Educational Studies*: Conference Series, 3(3), 1439-1444. https://doi.org/10.20961/shes.v3i4.54405

Gea, I. F., & Laoli, B. (2025). Efektivitas Penggunaan Modul Ajar Pada Kurikulum Merdeka Kelas Vii Di Smp Negeri 2 Hiliduho Tahun Pelajaran 2023/2024. *Jurnal Suluh Pendidikan,* 13(1), 20-32. https://doi.org/10.36655/jsp.v13i1.1716

Hasan, M., Milawati, M., Darodjat, D., Harahap, T. K., Tahrim, T., Anwari, A. M., ... & Indra, I. (2021). *Media pembelajaran*

Hutauruk, A. F., Subakti, H., Simarmata, J., Soputra, D., Lestari, H., Al Haddar, G., ... & Cahyaningrum, V. D. (2022). *Media Pembelajaran dan TIK*.

Kusuma, J. W., Akbar, M. R., & Fitrah, M. (2023). *Dimensi Media Pembelajaran (Teori dan Penerapan Media Pembelajaran Pada Era Revolusi Industri 4.0 Menuju Era Society 5.0*). PT. Sonpedia Publishing Indonesia.

Lorenza, F. D., Syamsiwna, S., & Fajri, H. (2024). Kelayakan, *flash card* Kelayakan Media *Flash card* Sub Materi Manfaat Keanekaragaman Hayati Berbasis Tumbuhan Upacara Adat:(*Feasibility of Flashcard Media Sub-Material Benefits of Plant-Based Biodiversity in Traditional Ceremonies*). BIODIK, 10(1), 89-97. https://doi.org/10.22437/biodik.v10i1.32555

Muhammad, M. N., & Laelasari, I. (2025). Sirup Parijoto sebagai Literasi Kearifan Lokal Siswa: Inovasi *Flashcard* Etnosains dalam Pembelajaran IPA. JagoMIPA: *Jurnal Pendidikan Matematika dan IPA*, 5(3), 1017-1033. https://doi.org/10.53299/jagomipa.v5i3.1883

Mustaqimah, N., Dama, L., Usman, N. F., & Akbar, M. N. (2023). Pengembangan Media *Flash card* Dengan Panduan Belajar Sambil Bermain Menggunakan Microsite untuk Pembelajaran Biologi Materi Klasifikasi Makhluk Hidup. *Khazanah Pendidikan*, 17(1), 376-384. https://doi.org/10.30595/jkp.v17i1.17159

Nainggolan, A. M., & Daeli, A. (2021). Analisis teori perkembangan kognitif Jean Piaget dan implikasinya bagi pembelajaran. *Journal of Psychology Humanlight*, 2(1), 31-47. https://doi.org/10.51667/jph.v2i1.554

Nasution, M. W., & Tambunan, E. P. S. (2024). *Development of Flashcard Media on Reproductive System Material to Enhance Highschool Students' Higher-Order Thinking Skills*. Prisma Sains: *Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram*, 12(3), 519-527. https://doi.org/10.33394/j-ps.v3i2

Pertiwi, Y., & Rahmatika, H. (2024). Pengaruh Penggunaan Booklet Sistem Imun terhadap Hasil Belajar Peserta Didik Kelas XI MAN 3 Kota Padang. *Jurnal Bioshell*, 13(1), 31-36. https://doi.org/10.56013/bio.v13i1.2760

Puriasih, A. L., & Cahyadin, A. (2023). Upaya Meningkatkan Aktivitas Dan Hasil Belajar Peserta Didik Kelas XII Melalui Penggunaan Media *Flash Card* Pada Materi Evolusi. *Bioed: Jurnal Pendidikan Biologi*, 11(1), 66-74. https://doi.org/10.25157/jpb.v11i1.10180

Rochaendi, E., Fuadi, A., & Sholihah, D.A. (2024). *Pengembangan Media Pembelajaran*. ITERA Press: Lampung Selatan

Saputri, A. W., & Lisdiana, L. (2025). Pengembangan Media *Flash card* dengan Model *Two Stay Two Stray* untuk Meningkatkan Pemahaman Konsep pada Sub Materi Struktur dan Fungsi Sel. *Berkala Ilmiah Pendidikan Biologi* (BioEdu),14(1),202-210. https://doi.org/10.26740/bioedu.v14n1.p202-210

Sarnia, S., Japa, L., & Artayasa, I. P. (2024). Pengaruh media pembelajaran kartu bergambar (*flash card*) terhadap hasil belajar biologi siswa kelas X IPA MA dakwah islamiyah putri kediri Lombok Barat. *Jurnal Pendidikan, Sains, Geologi, dan Geofisika* (GeoScienceEd Journal), 5(1), 86-90. https://doi.org/10.29303/goescienceed.v5i1.296

Setiawan, R., & Septian, R. Y. (2025). Media Pembelajaran Interaktif: Analisis Terhadap Pemanfaatan Media *Powerpoint* Dalam Pendidikan. *In Proceeding International Seminar of Islamic Studies* (pp. 2832-2837). https://doi.org/10.3059/insis.v0i0.23791

Setyawan, P., & Ibrahim, M. (2019). Pengembangan Media *Flash card* Berbasis *Pictorial Riddle* Pada Materi Plantae untuk Meningkatkan Motivasi dan Pemahaman Konsep Siswa SMA/MA Kelas X. *Berkala Ilmiah Pendidikan Biologi (*BioEdu), 8(2), 260-269. https://doi.org/10.26740/bioedu.v9n2.p292-301

Sirih, M., Sabilu, M., & Sudirman, R. S. P. (2023). Pengaruh Media *Flash Card* Terhadap Hasil Belajar Kognitif Siswa Materi Animalia Kelas X IPA Di SMA Negeri 8 Kendari. AMPIBI: *Jurnal Alumni Pendidikan Biologi*, 8(2), 134-139. https://doi.org/10.36709/ampibi.v7i1.24081

Sugiyono. (2016). *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.

Tamboo, C. I., Mardin, H., Husain, I., Ibrahim, M., & Usman, N. F. (2024). Pengembangan Media Pembelajaran *Flash card* Berbasis *Augmented Reality* Pada Materi Sel Di Kelas XI SMA Negeri 1 Tibawa. ORYZA (*Jurnal Pendidikan Biologi*), 13(2), 240-253. https://doi.org/10.33627/oz.v13i2.2750

Wahyudin, D., Subkhan, E., Malik, A., Hakim, M. A., Sudiapermana, E., LeliAlhapip, M., Nur Rofika Ayu Shinta Amalia, L. S., Ali, N. B. V., & Krisna, F. N. (2024). *Kajian Akademik Kurikulum Merdeka*. Kemendikbud, 1–143.

Wicaksana, S. B., & Anistyasari, Y. (2020). Tinjauan Pustaka Sistematis Tentang Penggunaan *Flash card* pada Media Pembelajaran Berbasis *Augmented Reality*. *Jurnal IT- EDU*, 5(1), 121–131. https://doi.org/10.26740/it-edu.v5i2.36597