



Meta-analysis of the development of booklets as learning materials in biology learning

Rara Aulia Putri^{1*}, Zulyusri¹

¹Biology Education Study Program, Universitas Negeri Padang, Indonesia

*E-mail: auliaputrirara63@gmail.com

Abstract. Booklets are printed teaching materials widely used in biology learning because they present material concisely and systematically, supported by relevant illustrations, making it easier for students to understand concepts. Before being used in the learning process, booklets must undergo validation to ensure they meet eligibility standards. This study aims to examine the validity of booklet development in biology learning using a descriptive meta-analysis approach. Research data were obtained from scientific articles identified through Google Scholar, in accordance with the PRISMA 2020 guidelines. The initial search yielded 33 articles; the identification, screening, and selection processes were then carried out based on inclusion criteria, resulting in 10 articles that met the requirements for analysis. The analysis focused on four validity components, namely content, language, presentation, and graphics. The synthesis results showed that the booklet's average validity was 88.97%, placing it in the very valid category. Among the four aspects analyzed, the presentation aspect obtained the highest average of 90.11%, followed by the content aspect at 89.48%, the graphic aspect at 88.85%, and the linguistic aspect at 87.43%. These findings indicate that the booklet is highly suitable for use as teaching materials in biology instruction. In addition to providing an overview of the quality of the booklet's validity, the results of this study can also be used as a reference for educators and teaching material developers in designing booklets that meet the suitability standards, as well as serve as a basis for further research focused on developing higher-quality biology teaching materials.

Keywords: *Biology learning, Booklet, Learning material, Meta-analysis, Validity*

Received: 28 June 2026 Revised: 08 July 2026 Accepted: 09 July 2026 Published: 16 July 2026

INTRODUCTION

Biology learning requires resources that help students understand abstract concepts, microscopic structures, and complex biological mechanisms. Therefore, the existence of teaching materials is a crucial component in supporting the achievement of learning objectives. Teaching materials designed to reflect the material's characteristics and students' needs not only present information systematically but also facilitate a deeper understanding of concepts. In addition to increasing the effectiveness of the learning process, the use of appropriate teaching materials can encourage active student involvement and foster independence in learning (Puspita, 2019). Thus, developing quality teaching materials is one of the efforts that needs to be made to improve the quality of biology learning (Sari et al., 2024). Various innovations continue to be developed to ensure that the teaching materials used provide a more engaging, contextual, and meaningful learning experience.

Teaching materials function as the main tool that supports the process of delivering material, and also as a learning resource for students (Puspita, 2019). Its composition requires attention to systematic aspects, clarity of language, and appropriateness to user characteristics to ensure the information presented is easier to understand. Besides assisting teachers in organizing learning activities, teaching materials also provide students with opportunities to study them independently at their own pace. This contributes to improved conceptual understanding and the quality of learning outcomes (Agustini et al., 2023). Therefore, the development of innovative, effective teaching materials that are in line with current learning demands continues to be a concern in the world of education (Saleh & Arya, 2025).

In biology education, the need for high-quality teaching materials is becoming increasingly important because much of the material covers complex concepts, microscopic organisms, and biological processes that cannot be directly observed. Using inappropriate teaching materials can hinder students' understanding of the material being studied. Therefore, teaching materials are needed that present information in a coherent, engaging, and easy-to-understand manner, helping students develop a deeper understanding of the concepts. In addition to supporting classroom learning activities, teaching materials also serve as independent learning resources, allowing students to study the material according to their individual needs and learning pace (Syahriani & Sofyan, 2020). Thus, students are not only required to memorize information, but also to be able to connect and understand the relationship between concepts in biology (Kundariati et al., 2022).

One form of printed teaching material widely used in biology learning is the booklet. This teaching material is packaged in a practical, book-sized format, presenting material concisely and systematically, and enriched with relevant illustrations, making it easier for students to understand biological concepts (Syamsurizal et al., 2021). Their relatively small size makes booklets easy to carry and use anytime, either as a learning aid in class or as a resource for independent learning. The simple presentation of the material allows students to gradually learn the booklet's content at their own pace. Therefore, booklets are seen as an effective alternative teaching material to support the biology learning process. To ensure the resulting product is truly suitable for use, the development process must consider student characteristics, material characteristics, learning outcomes, and the desired learning objectives (Pamela & Zulyusri, 2024).

Booklets offer several advantages that make them an effective alternative teaching material for biology. Their concise, systematic presentation and appropriate illustrations help students focus on key concepts, making the material easier to understand. Besides being used as a learning aid in class, booklets can also be used as independent learning resources due to their practical, portable format and the ability to be studied at any time, according to each student's needs and learning pace (Syamsurizal et al., 2021). Various studies have shown that the use of booklets can support a more effective learning process, increase student participation during learning activities, and help strengthen understanding of biological concepts (Ningsih & Yakub, 2025). Therefore, booklets are one of the teaching materials that have the potential to provide a more optimal learning experience (Ningsih & Yakub, 2025).

Every product produced through research and development must undergo an evaluation process before being implemented in learning. This stage aims to ensure that the developed teaching materials meet quality standards and are suitable for student use (Lutfiani et al., 2020). One aspect that receives primary attention in the evaluation process is validity. Validity describes the extent to which teaching materials are suitable based on expert assessments of content, language, presentation, and graphics. Through validity testing, it can be determined whether a teaching material aligns with learning objectives, student characteristics, and the principles of good teaching materials development. Therefore, validation results serve as an important basis for determining the suitability of a product before it is used in learning activities (Ningtyas & Rahmawati, 2023).

Studies on the validity of booklets remain relevant, given their growing use as teaching materials in biology across a variety of subjects. Various developmental studies have reported that booklets are highly valid, as assessed in terms of content, language, presentation, and graphics, making them suitable for use as teaching materials (Syamsurizal et al., 2021). However, each study was conducted on different materials, product characteristics, and development procedures, resulting in varying levels of validity. This situation results in information regarding the validity of booklets being scattered across various studies, and not providing a comprehensive picture. Therefore, a research synthesis

using meta-analysis is needed to systematically integrate the results of previous studies. In this study, the identification, selection, and determination of articles were carried out in accordance with the PRISMA 2020 guidelines (Page et al., 2021). This method is expected to yield more comprehensive information regarding the validity of booklet development in biology learning. In addition to providing an overview of the quality of the booklets developed, the results of this study are also expected to serve as a reference for educators, researchers, and teaching materials developers in designing booklets that meet eligibility standards and serve as a foundation for future research on biology teaching materials development.

METHOD

This study applies a descriptive meta-analysis to provide a comprehensive overview of the validity of booklet development in biology learning. This method integrates and synthesizes quantitative data from previous studies to provide a more comprehensive assessment of the validity of booklets as teaching materials. The research data sources are scientific articles that discuss the development of biology learning booklets. Literature searches were conducted on Google Scholar using the following keywords: development of biology learning booklets, biology booklets, booklet validity, and booklet feasibility. The process of identifying and selecting articles follows the PRISMA 2020 guidelines, which include the stages of identification, screening, eligibility assessment, and determining articles that meet the requirements for analysis (included) (Page et al., 2021).

The initial search yielded 33 articles. A selection process was then conducted based on the established inclusion criteria. Five articles were excluded because they did not include information on the booklet's validity test results, while 18 were excluded because the validity data presented were incomplete for each assessment aspect. After going through all selection stages, 10 articles met the criteria and were used as data sources in this study. The process of identification and article selection is presented in Figure 1.

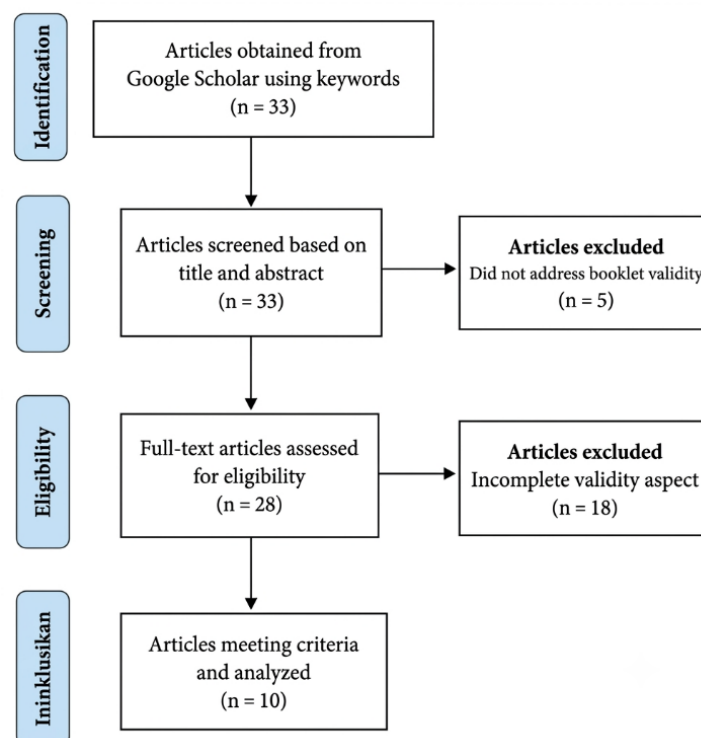


Figure 1. Flowchart of the article identification and selection process based on the 2020 PRISMA guidelines.

After determining which articles met the criteria, data extraction and tabulation were carried out. Information relating to the validity of the booklet in each article was first identified and then grouped into four assessment aspects: content, language, presentation, and graphics (Arikunto, 2018). Next, the validity values for each aspect are summarized, and the average is calculated to provide a general picture of the validity of booklet development in biology learning.

$$\text{Percentage (\%)} = \frac{X}{Y}$$

Description: X= Total percentage obtained

Y= Amount of data

Next, the calculation results are interpreted based on the validity categories presented in Table 1.

Table 1. Booklet validity categories

Percentage (%)	Criteria
81-100	Very Valid
61-80	Valid
41-60	Invalid
21-40	Very Invalid

Source: (Arikunto, 2018)

RESULTS AND DISCUSSION

This study reviews and analyzes several related articles, including those discussing the development of biology learning booklets. This study integrated the results of ten articles that met the inclusion criteria to obtain an overview of the validity of booklet development in biology learning. Each article was analyzed based on four assessment components: content, language, presentation, and graphics. A summary of the validity results from all studies is presented in Table 2, while the average score for each aspect is shown in Table 3.

Table 2. Results of booklet validity analysis from several studies

No.	Researcher	Research Title	Validated Aspects (%)				Average (%)
			Content	Language	Presentation	Graphics	
1.	Rahmi & Sumarmin, (2021)	Spiritually Inspired Booklet on Viruses for 10th Grade High School Students	94.44	94.44	95.83	90.74	93.86
2.	Savira & Darussyamsu, (2022)	Validity of a Spiritually Inspired Booklet on Protista as a Supplement to Biology Teaching Materials for 10th Grade High School Students	84.84	86.11	83.88	91.67	86.62
3.	Putry & Darussyamsu, (2022)	Validation of the Development of a Conceptually Inspired Booklet on the Structure and Function of Cell Organelles for 11th Grade High School	87.50	85.00	92.00	85.00	87.37

No.	Researcher	Research Tittle	Validated Aspects (%)				Average (%)
			Content	Language	Presentation	Graphics	
		Students					
4.	Ulandari & Syamsurizal, (2021)	A Supplemental Booklet on Protista for 10th Grade High School Students	87.50	87.87	98.33	91.66	91.34
5.	Putri et al., (2021)	A Human Excretory System Booklet as a Supplement to Biology Teaching Materials for 11th Grade High School Students	90.47	85.00	88.33	86.90	87.68
6.	Harahap et al., (2020)	Validity of the Human Respiratory System Booklet as a Learning Supplement for 8th Grade Junior High School Students	91.25	88.00	84.00	95.00	89.56
7.	Syafrina et al., (2023)	Development of an Integrated Booklet on Preventive Values of Human Circulatory System Disorders for High School Students	94.79	87.50	94.44	88.19	91.23
8.	Gusmar et al., (2022)	Validity of the Development of an Integrated Booklet on Local Potential of Pesisir Selatan Regency for 10th Grade High School Students	89.25	88.33	90.38	87.12	88.77
9.	Hidayat et al., (2023)	Development of a Booklet on Plant Species as Food Sources for Proboscis Monkeys in the Curiak Island Research Station Area	81.95	86.08	88.91	85.52	85.61
10.	Ramadhani et al., (2021)	Validity of the Human Circulatory System Booklet as an Independent Teaching Material for Natural Science in 8th Grade Junior High School Students	92.85	86.00	85.00	86.66	87.62
Average			89.48	87.43	90.11	88.85	88.97

Based on the data synthesis results in Table 3, the booklet's average validity was 88.97%, indicating it is highly valid. This achievement indicates that the booklet developed across various studies has met the eligibility criteria for use as teaching material, as determined by expert assessments of content, language, presentation, and graphics. With this level of validity, the booklet has strong potential to be used as a teaching material in biology learning.

Table 3. Results of the booklet validity test analysis

No.	Component	Validity	Criteria
1.	Content	89.48	Very Valid
2.	Language	87.43	Very Valid
3.	Presentation	90.11	Very Valid
4.	Graphics	88.85	Very Valid
Average		88.97	Very Valid

The findings of this study strengthen the results of a meta-analysis conducted by [Sarinami & Zulyusri \(2022\)](#), who reported that booklets used as supplementary biology teaching materials at the high school/vocational school level had validity in the very valid category. Similar results were also reported by [Putri et al. \(2024\)](#), which states that booklets meet eligibility standards based on evaluations of content, language, presentation, and graphics. The similarity of these results demonstrates the consistent findings that booklets are a form of teaching material with high validity and are suitable for application in biology learning.

The high validity scores obtained in this study are influenced by the diversity of biological materials used as development objects in the articles analyzed. These materials include viruses, protists, the structure and function of cell organelles, the excretory system, the respiratory system, the circulatory system, plantae, and even plants used as food sources for proboscis monkeys, which are developed as local potential. This variety of materials demonstrates that the booklet can be applied to various biological topics with different characteristics, both conceptual and those explaining complex biological processes.

In addition to the diversity of materials, the booklet's high validity is also related to the development procedures used in each study. Despite using different models, such as ADDIE, the 4-D (Four-D) Model, or models tailored to the research needs, all articles consistently implemented a systematic development process. These stages include needs analysis, product design, development, expert validation, and revision based on validator input. The implementation of these structured procedures contributed to the quality of the resulting booklet, ensuring it met the eligibility criteria in every aspect of the assessment. Thus, the booklet's high validity is influenced not only by the quality of its content but also by its systematic development process, which is oriented towards product quality.

The content aspect achieved an average validity of 89.48%, categorized as very valid. This value indicates that the booklet and its materials align with the learning objectives and competencies students must achieve. Content suitability is crucial when developing teaching materials because it influences the accuracy of the concepts students receive. Highly valid teaching materials can help students better understand concepts and reduce misconceptions during the learning process. Research results [Khairunnisa et al. \(2022\)](#) supports this finding by stating that the content aspect is the primary factor determining the suitability of a booklet as a medium and teaching material.

In terms of language, the average validity was 87.43%, which is highly valid. This result indicates that the language used in the booklet meets the principles of readability, clarity of information, and appropriateness to the student's developmental level. Communicative and easy-to-understand language helps students better grasp information. The use of appropriate terms and simple sentences can also improve the quality of instructional materials, resulting in a better learning experience. The results of the booklet development research indicate that language is crucial to helping students understand what they are learning.

Compared to other aspects, the presentation aspect achieved the highest validity score, averaging 90.11%. This result indicates that the material in the booklet is systematically organized, coherent, and easily understood by students. A structured presentation can help

students understand the relationships among ideas and facilitate independent learning. During the learning process, engaging presentations can help increase student attention and motivation. These results align with research by Ayunda & Lufri (2024), which found that a systematic presentation of material is one of the main factors supporting the high validity of booklet teaching materials in biology learning.

Meanwhile, the graphical aspect achieved an average validity of 88.85%, categorized as very valid. This score indicates that the booklet has good visual quality in its layout, color use, illustrations, and font selection. Attractive graphic components can help students focus their attention on what they are learning and increase their interest in learning. To make abstract biological concepts easier to understand, relevant illustrations can also be used. These results are supported by research on booklet development, which shows that graphical elements significantly contribute to the quality and suitability of teaching materials.

The findings of this meta-analysis indicate that booklets with a very high level of validity are suitable for use as teaching materials to support biology learning. A high level of validity indicates that the material presented aligns with the learning objectives, is systematically structured, and uses language and presentations that facilitate students' understanding of the concepts. Conversely, teaching materials that do not meet validity standards can lead to misunderstandings, present inaccurate information, and reduce the effectiveness of the learning process. However, this study still has limitations: it analyzed only 10 articles and focused solely on validity, without considering the practicality and effectiveness of booklet use. Therefore, further research should involve more articles and examine various aspects of teaching material quality to obtain a more comprehensive picture of booklet development in biology learning.

CONCLUSION

Based on a synthesis of 10 articles that met the inclusion criteria, it can be concluded that the development of biology learning booklets has a very high level of validity, with an average score of 88.97%. All analyzed components, including content, language, presentation, and graphics, were categorized as highly valid, indicating that the booklets meet the standards for suitability as teaching materials. The results of this study demonstrate that booklets have the potential to serve as an alternative teaching material that can support the biology learning process, as they were developed according to sound validity criteria. In addition to providing a general overview of the validity of booklets developed across various studies, these findings can also serve as a reference for educators, researchers, and teaching material developers in designing booklets that comply with teaching material development standards. Furthermore, further research is recommended to examine not only validity but also the practicality and effectiveness of booklet use, using a broader range of articles to obtain a more comprehensive picture of the quality of these teaching materials.

REFERENCES

- Agustini, E., Yeni, LF, & Titin, T. (2023). Kelayakan E-Modul Berbasis Inkuiri Terbimbing Sebagai Bahan Ajar pada Materi Jamur Kelas X SMA:(Kelayakan E-Modul Berbasis Inkuiri Terbimbing Sebagai Bahan Ajar Materi Jamur Kelas X SMA). *BIODIK* , 9 (2), 72-81. <https://doi.org/10.22437/biodik.v9i2.20183>
- Arikunto, S., & Jabar, C. (2018). Evaluasi Program Pendidikan. Jakarta: Bumi Aksara. https://drive.google.com/file/d/1v2IsCrfiIen0wFjyeq0D89ufvnGlvz8c/view?usp=drive_sdk
- Ayunda, S. N., & Lufri. (2024). Meta-Analisis: Validitas Pengembangan E-Booklet Pembelajaran Biologi untuk Murid SMA. *Al Jahiz: Journal of Biology Education Research*, 5(2), 152–163. <https://doi.org/10.32332/al-jahiz.v5i2.9664>

- Gusmar, R. A., Arsih, F., Alberida, H., & Rahmatika, H. (2022). Validitas Pengembangan *Booklet* Terintegrasi Potensi Lokal Kabupaten Pesisir Selatan pada Materi Plantae Kelas X SMA. *FONDATIA*, 6(4), 914–924. <https://doi.org/10.36088/fondatia.v6i4.2317>
- Harahap, I. A., Helendra, H., Farma, S. A., & Syamsurizal, S. (2020). Validity of the Human Respiratory System *Booklet* s as Learning Supplement for Student Class VIII Junior High School. *Bioeducation Journal*, 4(2), 103–110. <https://doi.org/10.24036/bioedu.v4i2.272>
- Hidayat, M., Amintarti, S., & Rezeki, A. (2023). Pengembangan *Booklet* Jenis Tumbuhan Sumber Pakan Bekantan Di Kawasan Stasiun Riset Pulau Curiak. *JUPEIS : Jurnal Pendidikan dan Ilmu Sosial*, 2(1), 85–91. <https://doi.org/10.57218/jupeis.Vol2.Iss1.537>
- Khairunnisa, K., Ningsih, K., & Panjaitan, R. G. P. (2022). Kelayakan media *booklet* pada materi interaksi makhluk hidup dan lingkungannya kelas VII. *Jurnal Pendidikan Informatika dan Sains*, 11(2), 148–155. https://www.researchgate.net/publication/383295905_Kelayakan_media_booklet_pada_materi_interaksi_makhluk_hidup_dan_lingkungannya_kelas_VII
- Kundariati, M., Maghfiroh, L., Indriwati, S. E., Rohman, F., & Priambodo, B. (2022). Revealing the effect of local-based teaching materials toward scientific reasoning, argumentation, and problem-solving in biology classroom. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 8(3), 287–295. <https://doi.org/10.22219/jpbi.v8i3.21973>
- Lutfiani, E., Suhandha, H., & Wiji, W. (2020). Pengembangan Bahan Ajar Faktor-Faktor Yang Mempengaruhi Laju Reaksi Sebagai Prototipe Buku Teks Berbasis Intertekstual. *Jurnal Riset dan Praktik Pendidikan Kimia*, 8(2), 49–54. <https://doi.org/10.17509/jrppk.v8i2.52294>
- Ningsih, I. K., & Yakub, P. (2025). Efektivitas E-Booklet Materi Keanekaragaman Hayati untuk Melatihkan Literasi Sains Peserta Didik Kelas X SMA. *BioEdu*, 14(3), 597–607. <https://doi.org/10.26740/bioedu.v14n3.p597-607>
- Ningtyas, H. A., & Rahmawati, L. E. (2023). *Kelayakan isi, penyajian, kebahasaan, dan kegrafikan bahan ajar teks deskripsi di SMP Kelas VII* (Doctoral dissertation, Universitas Muhammadiyah Surakarta). <https://doi.org/10.22236/imajeri.v6i1.10977>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*, 372. <https://doi.org/10.1136/bmj.n71>
- Pamela, A., & Zulyusri, Z. (2024). Meta-analisis: Validitas media *booklet* pada pembelajaran biologi (tahun 2013-2023). *Symbiotic: Journal of Biological Education and Science*, 5(1), 84–95. <https://symbiotic.iainkerinci.ac.id/index.php/symbiotic/article/view/119>
- Puspita, L. (2019). Pengembangan modul berbasis keterampilan proses sains sebagai bahan ajar dalam pembelajaran biologi. *Jurnal Inovasi Pendidikan IPA*, 5(1), 79–88. <https://doi.org/10.21831/jipi.v5i1.22530>
- Putri, N. H., Syamsurizal, S., & Atifah, Y. (2021). *Booklet* sistem ekskresi pada manusia sebagai suplemen bahan ajar biologi kelas XI SMA. *Journal for Lesson and Learning Studies*, 4(3), 309–314. <https://doi.org/10.23887/jlls.v4i3.38136>
- Putry, W. D., & Darussyamsu, R. (2022). Pengembangan *Booklet* Bernuansa Konseptual Tentang Materi Struktur dan Fungsi Organel Sel untuk Murid Kelas XI SMA. *Journal on Teacher Education*, 4(1), 272–278. <https://journal.universitaspahlawan.ac.id/index.php/jote/article/view/6154>

- Rahmi, D., & Sumarmin, R. (2021). *Booklet* Bernuansa Spiritual pada Materi Virus untuk Murid Kelas X SMA/MA. *Jurnal Penelitian dan Pengembangan Pendidikan*, 5(2), 234-241. <https://ejournal.undiksha.ac.id/index.php/JJL/article/view/35641>
- Ramadhani, Y., Helendra, H., Farma, S. A., & Syamsurizal, S. (2021). Validity Of the Human Circulatory System *Booklet* s as an Independent Teaching Material for Natural Science in Class VIII Junior High School. *Bioeducation Journal*, 5(1), 11–18. <https://doi.org/10.24036/bioedu.v5i1.288>
- Saleh, A. R. & Arya. (2025). Meta-Analisis Pengaruh Bahan Ajar Terhadap Hasil Belajar Biologi Siswa SMP dan SMA Di Indonesia. *Biology and Education Journal*, 5(2), 75-89. <https://doi.org/10.25299/baej.2025.21694>
- Sarinami, P., & Zulyusri, Z. (2022). Meta-analisis validitas pengembangan *booklet* sebagai suplemen bahan ajar pada pembelajaran biologi SMA/MA. *Jurnal Metaedukasi: Jurnal Ilmiah Pendidikan*, 4(2), 76–82. <https://doi.org/10.37058/metaedukasi.v4i2.5437>
- Sari, H. D., Riandi, R., & Surtikanti, H. K. (2024). Bahan ajar digital bermuatan potensi lokal untuk meningkatkan pemahaman konsep dan motivasi belajar pada materi bioteknologi konvensional. *Jurnal Basicedu*, 8(1), 263-276. <https://doi.org/10.31004/basicedu.v8i1.6503>
- Savira, T., & Darussyamsu, R. (2022). Validitas *Booklet* Bernuansa Spiritual tentang Materi Protista sebagai Suplemen Bahan Ajar Biologi Kelas X SMA/MA. *Journal on Teacher Education*, 4(1), 272-278. <https://journal.universitaspahlawan.ac.id/index.php/jote/article/view/5808>
- Syafrina, R., Yogica, R. Y. R., Yuniarti, E. Y. E., & Darussyamsu, R. D. R. (2023). Pengembangan *Booklet* Terintegrasi Nilai Preventif Gangguan Sistem Sirkulasi Manusia untuk Murid SMA:(Development of *Booklet* an Integrated of Preventing Value on Human Circulatory System Disease for Senior High School Students). *BIODIK*, 9(2), 164-170. <https://doi.org/10.22437/biodik.v9i2.21088>
- Syahriani, S., & Sofyan, S. (2020). Pengembangan Bahan Ajar berbasis Komik Materi Pteridophyta pada Mahasiswa Pendidikan Biologi UIN Alauddin Makassar:(Pengembangan Bahan Ajar Pteridophyta Berbasis Komik Bagi Mahasiswa Pendidikan Biologi UIN Alauddin Makassar). *BIODIK*, 6 (2), 118-132. <https://doi.org/10.22437/bio.v6i2.8855>
- Syamsurizal, S., Syarif, E. A., Darussyamsu, R., & Farma, S. A. (2021). Developing Human Movement System *Booklet* as a Biology Teaching Material Supplement for XI Grade Students. *Journal of Biological Education Indonesia (Jurnal Pendidikan Biologi Indonesia)*, 7(1), 95-103. <https://doi.org/10.22219/jpbi.v7i1.12828>
- Ulandari, T., & Syamsurizal, S. (2021). *Booklet* suplemen bahan ajar pada materi Protista untuk kelas X SMA/MA. *Jurnal Penelitian dan Pengembangan Pendidikan*, 5(2), 301-307. <https://ejournal.undiksha.ac.id/index.php/JJL/article/view/37688>