



## Development of an Inquiry-Based Science Module on Plant Parts and Their Functions in Elementary Schools

Ana Maymunah<sup>1</sup>, Mmankoko Ramorola<sup>2</sup>, Ishola Olukayode Shobowale<sup>3</sup>

<sup>1</sup> Madrasah Ibtidaiyah Teacher Education Department, Tarbiyah and Teacher Training Faculty, Institut Agama Islam Negeri Raden Intan Lampung, Lampung, Indonesia

<sup>2</sup>University of South Africa

<sup>3</sup>University of Lagos

### Article Info

#### Article history:

Received Oct 9, 2023

Revised Oct 31, 2023

Accepted Dec 17, 2023

OnlineFirst Dec 22, 2023

#### Keywords:

Inquiry  
Module  
Science

### ABSTRACT

**Purpose of the study:** The aim of this research is to produce a product in the form of an inquiry-based science module for class IV elementary school and to determine students' responses to the feasibility of an inquiry-based science module on plant parts and their functions.

**Methodology:** This type of research uses the R & D (Research and Development) development method. The data collection technique in this research is using observation sheets, interview sheets, and questionnaires. Data analysis uses descriptive statistics. Qualitative data will be analyzed logically and meaningfully, while quantitative data will be analyzed using average calculations.

**Main Findings:** The main result of this research is that a module is obtained that is suitable for use as teaching material in class IV elementary schools on science learning material regarding plants and their functions. This is demonstrated based on the assessment of material experts, media experts and teachers with the ideality of the material being explained in detail accompanied by illustrations or picture descriptions, the material is also explained using an inquiry approach, and the module contains information that increases students' knowledge. This is confirmed by the average assessment percentage of 87.9% for material experts, 84.1% for media experts, and 84.9% for teachers.

**Novelty/Originality of this study:** Then the novelty of this research lies not only in conveying knowledge about plant parts and their functions but also in fostering a deep curiosity and appreciation of nature through an interactive, inquiry-based learning approach.

*This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license*



### Corresponding Author:

Ana Maymunah,

Madrasah Ibtidaiyah Teacher Education Department, Tarbiyah and Teacher Training Faculty, Institut Agama Islam Negeri Raden Intan, Jl. Letnan Kolonel H. Endro Suratmin, Sukarame, Kota Bandar Lampung, 35131, Indonesia

Email: [anamay1@gmail.com](mailto:anamay1@gmail.com)

## 1. INTRODUCTION

Learning is an important human activity and cannot be separated from human life, it knows no age limits for both children and parents. According to the Islamic view, science is obligatory for every Muslim [1]-[2]. With knowledge, heaven will be obtained because with knowledge people can worship Allah SWT correctly and with knowledge a Muslim can also do good deeds [3], [4]. This is in accordance with the Turmudzi hadith, which means: "From Abu Hurairah ra. That the Messenger of Allah. said: Whoever takes a path in search of knowledge. So Allah makes it easy for that person because knowledge is the path to heaven (*H.R. Muslim*)" [5].

Learning is done so that we understand and comprehend what is unknown, in this case learning is not only in the form of religious knowledge, but in the form of knowledge that is relevant to the guidance and progress of the times [6]-[7]. Apart from that, this knowledge must also be useful for oneself and many people.

Knowledge can be obtained through the learning process. The learning process does not have to be delivered by a person or teacher, but can be conveyed through television, printed materials, pictures, computers and other learning resources. [8]-[9]. Learning resources and teaching materials are both meant for the same thing but sometimes they are meant for different things, depending on the context of the conversation [10], [11]. Teaching materials are an important part of the learning process that determines its success so that learning objectives are achieved and determines learning activities [12], [13]. Teaching materials according to their type are divided into 4, namely printed teaching materials, audio teaching materials, audio visual teaching materials, and interactive teaching materials [14]. One of the printed teaching materials that is often used in the learning process is such as modules.

Modules can be interpreted as printed learning units [15]. Modules are print-based teaching materials that contain one topic or one unit of learning material with study time for one week which functions as an independent learning medium without being focused on teacher guidance. [16], [17]. The module is written with the aim that students can learn independently without or with teacher guidance [18], [19]. This is the reason printed teaching materials in the form of modules are more often used in the learning process. Because the module increases the efficiency and effectiveness of learning in schools, including time, funds, facilities and energy to achieve goals optimally, a learning approach is needed that supports this.

A learning approach that is suitable for elementary school/Madrasah Ibtidaiyah children is inquiry. The inquiry approach is suitable because natural science education is directed at inquiry and action so that it can help students gain a deeper understanding of the natural environment. [20]-[22]. Natural Science (IPA) is concerned with knowing about nature systematically, so that science is not only mastery of a collection of knowledge in the form of facts, concepts or principles but also a discovery [23]-[25]. It is hoped that science education can become a vehicle for students to learn about themselves and the natural world around them, as well as further development in applying it in everyday life [26]-[28]. Meanwhile, inquiry is a teaching approach that seeks to lay the foundation and develop creativity in solving problems [29], [30]. Students are truly placed as learning subjects, the role of the teacher in the inquiry approach is that of a guide and facilitator of learning [31]. The main task of the teacher is to choose problems that need to be posed in class to be solved by the students themselves [32]. However, guidance and supervision from teachers is still needed, but interference with students' activities in solving problems must be reduced.

Based on the results of pre-survey observations carried out by researchers at the 01 Budi Lestari Elementary School, Tanjung Bintang District, South Lampung, it shows that the form of learning media used is using modules and textbooks. However, the modules used do not have instructions for using the modules, glossary, competency standards, and basic competencies. Apart from that, the modules used are less interesting, they are only informative, have no color, illustrations or decoration and image captions so that students tend to get bored and less motivated in learning, and the available modules have not been specifically designed using an inquiry approach. In the learning process, the role of educators is still more dominant than that of students, which makes students less active in using learning, so that the aim of the modules used as teaching materials is not to enable students to learn independently. This is the reason why students have not reached the Minimum Completeness Criteria score. This can be seen from students' daily test scores, especially regarding plant parts and their functions.

This research on developing inquiry-based science modules is not the first, so previous researchers have provided a map of the problems that have been discussed. Based on the results of previous researchers, this research could be a complement, continuation, or it could also discuss things that were not discussed in previous research. Research conducted by Alwina Sucita under the title "Development of a Science Learning Module Based on Guided Inquiry on Classification of Living Creatures Material in Collaboration with Crossword Games, for Class VII Students of SMPN Kaur," shows that the module created falls within the very feasible criteria. This is based on validation results which show good results, namely 96.24% from validation from material experts, 93.75% from media experts, and 94.66% from language experts. Meanwhile, the student response results were 94.5%, indicating very feasible criteria [33].

Based on the problems above, it shows the need to develop teaching materials, namely in the form of modules. This science module specifically discusses plant parts and their functions. The development of teaching materials for this module uses an inquiry approach. The urgency of the research is to help students better understand natural science learning material regarding plant parts and their functions. The novelty in this research lies in its approach to engaging young minds through inquiry-based learning, which encourages students to explore, question and discover concepts independently. Then the novelty of this research lies not only in conveying knowledge about plant parts and their functions but also in fostering a deep curiosity and appreciation of nature through an interactive, inquiry-based learning approach. This idea was realized in the form of research

which aims to develop an inquiry-based science module on plant parts and their functions for class IV at the Negeri 01 Budi Lestari elementary school, Tanjung Bintang District, South Lampung. .

## 2. RESEARCH METHOD

The method used in this research is the research and development method. Development research is a process used to develop and validate research products used in education and learning. Development is different from educational research because the goal of development is to produce products based on findings field tests then revised and so on. The research and development steps are shown in Figure 1.

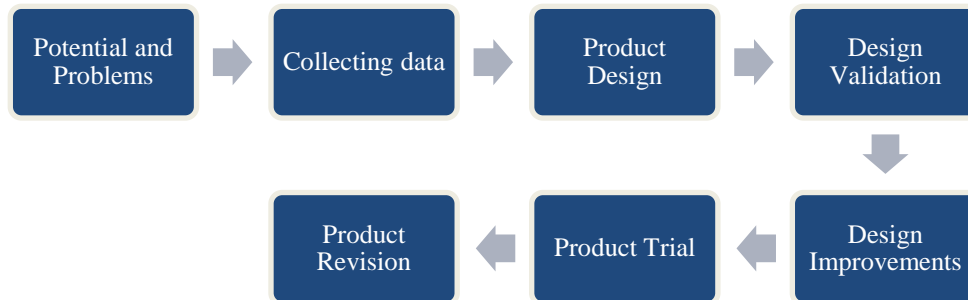


Figure 1. Research Steps

The data collection technique in this research is using observation sheets, interview sheets, and questionnaires. Observation is observation (data collection) to find out how far the effect of the action has reached the target [34]. The observation sheet is used to find out initial data based on data information that is in accordance with observations made by the researcher [35]. Interviews are a data collection technique carried out by researchers if they want to know things from respondents in more depth and the number of respondents is small [36]. The interview sheet is used to confirm the initial data obtained from observations regarding the use of teaching materials [37]. A questionnaire is a data collection technique that is carried out by giving a set of questions or written statements to respondents to answer [38]. This questionnaire sheet is to obtain information from respondents and to collect data regarding the accuracy of model components, material accuracy and the feasibility of this module [39]. The questionnaire sheets consist of assessment sheets from material experts, assessment sheets from media experts, and assessment sheets from teachers. The media experts in this research are Mmankoko Ramorola Ishola and Olukayode Shobowale.

Data analysis was carried out to obtain the feasibility of the learning media, namely the revised inquiry-based science module. The results obtained are used as consideration in improving the module. This development uses data analysis techniques, namely descriptive analysis. Descriptive analysis is used to analyze the results of the feasibility assessment by calculating the average. As the data collected can be grouped into two, namely: qualitative data in the form of numbers and qualitative data in the form of words. Qualitative data will be analyzed logically and meaningfully, while quantitative data will be analyzed using average calculations. The results of this descriptive analysis were used to determine the feasibility level of the development product in the form of an inquiry-based science module for class IV SDN 01 Budi Lestari South Lampung.

The results of data analysis are used as a basis for revising the module products developed. Data regarding opinions or responses to products collected through questionnaires is analyzed using descriptive statistics. The non-test instrument is a questionnaire using a Likert scale. The Likert scale is used to measure attitudes, opinions and perceptions of a person or group of people about social phenomena. In this study, a scale of 1 to 5 was used with the highest score being 5 and the lowest score being 1. To determine the percentage results of the assessment score, use the calculation formula which was obtained using the following formula:

$$p = \frac{f}{N} \times 100\% \quad (1)$$

Keterangan:

f = the frequency for which the percentage is being sought

N= maximum number of frequencies/scores (number of Cases)

p = percentage number or assessment score

To find the average, use the following calculation formula:

$$M_x = \frac{\sum f_x}{N} \quad (2)$$

Information:

$M_x$  = the mean we are looking for

$\sum f_x$  = the sum of the existing score scores

$N$  = the number of scores themselves

The results of the assessment scores using a Likert scale are then averaged from a number of trial sample subjects and converted into an assessment statement to determine the quality and level of usefulness of the product produced based on user opinions.

Eligibility Score	Criteria
0% - 20%	Not feasible
21% - 40%	Not worth it
41% - 60%	Decent enough
61% - 80%	Worthy
81% - 100%	Very worthy

Based on the criteria in Table 1. Feasibility Scale Table, a module is said to be feasible if it meets the feasibility score criteria, namely 61% - 80%. In this development, the module created must meet the appropriate criteria. Therefore, revisions are carried out if they still do not meet the eligibility criteria.

### 3. RESULTS AND DISCUSSION

In this section, it is explained the results of research and at the same time is given the comprehensive discussion. Results can be presented in figures, graphs, tables and others that make the reader understand easily [2], [5]. The discussion can be made in several sub-chapters.

This research was carried out at SDN 01 Budi Lestari, South Lampung. Preliminary data shows that the modules used do not have instructions for using modules, glossaries, competency standards, basic competencies. Apart from that, in terms of material, the modules used are only informative, incoherent and less systematic. In terms of module design, it is not attractive, it is not colorful, there are no illustrations or picture descriptions so students tend to get bored and less motivated in learning, and the available modules have not been specifically designed using an inquiry approach.

In terms of potential problem material obtained, namely the module used in this learning, the clarity and breadth of the material is still very lacking, it is only informative, not coherent, and not systematic. For example, the material that will be explained, namely the Structure and Function of Plant Parts, should have sub-headings in the media, namely roots, stems, leaves, flowers, fruit and seeds. However, in this media only roots, stems, leaves and flowers are presented. The explanation is still not detailed enough or is only informative. In terms of design, the product appearance is still less attractive and colorless, namely the media cover is very plain, colorless, there are no graphic illustrations displayed, the choice of font is still in format, the image illustrations on the material are not colored and the choice of location is less systematic.

At the data collection stage, researchers collected data or information regarding the module teaching materials used by class IV teachers in the science learning process. then processed and used to develop modules using Microsoft Office Word 2010 software with an inquiry learning approach in science education directed at acting so that it can help students gain a deeper understanding of the natural environment, foster the ability to think at work and be scientific. There are parts of the module that can help Students think knowing and being scientific can be seen as follows:

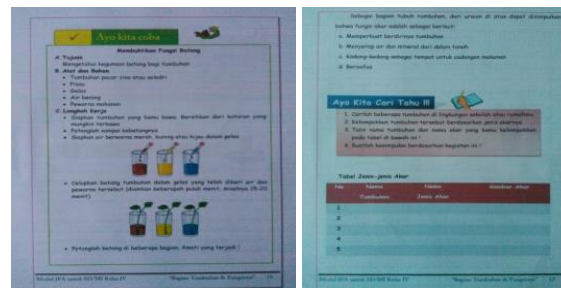


Figure 2. Practical Trial

Based on the existing initial product and the data obtained, the researcher developed the shortcomings of the initial product by designing the material product from 4 sub-headings to 5 sub-headings, namely roots,

leaves, flowers, fruit and seeds. The 5 sub-headings are then arranged into five activities which are developed based on the inquiry learning system. In the design part, the appearance is changed in media that is developed to make it more attractive using Microsoft Office Word 2010 software. These include designing the appearance of the front cover to make it more attractive with contrasting colors, using more diverse fonts or types of letters, arranging illustrations of the images on material systematically. Complete products that add images that match the characteristics of SD/MI students in detail or in accordance with the material explanation.



Figure 3. Development Results

According to material experts in the initial product, after being developed the material was quite feasible, but the glossary section still lacked a lot of improvements, the photosynthesis process was not explained, and the discussion of dicot and monocot material was repeated too much. The results of research from the two material experts on the initial product after development can be seen in the following table.

Table 2. Initial Stage Material Expert Validation Results

Assessment Aspects	Number per Aspect	Max Score	Score %	Criteria
Content Eligibility	82	120	68.3	Worthy
Inquiry Assessment	20	30	66.7	Worthy
Science	7	10	70	Worthy
Total number	109	160	205	Worthy
Average	36.3	53.3	68.3	Worthy

The design expert test examines aspects of graphic feasibility, language feasibility and graphic aspects with an assessment scale of 1-5. According to media experts, the media in the initial product process after being developed is feasible and attractive but needs to be improved, the cover design is still monotonous or less attractive, the material is given a frame and when validated the cover material is not strong or easily damaged. The results of the assessment from the two media experts on the initial product after development can be seen in the table.

Table 3 Initial Stage Media Expert Validation Results

Assessment Aspects	Number per Aspect	Max Score	Score %	Criteria
Graphic Eligibility	52	70	74.3	Worthy
Language Eligibility	31	40	77.5	Worthy
Graphic Aspects	40	60	66.7	Worthy
Total number	122	170	218.5	Worthy
Average	40.7	56.7	72.8	Worthy

According to material experts, the final product after revision is very suitable for use in learning because the glossary has been increased, the photosynthesis process has been explained and the discussion of dicot and monocot material has been reduced. Based on the product module developed, the results of product validation after being repaired by the two material experts are shown in the table.

Table 4 Final Stage Material Expert Validation Results

Assessment Aspects	Number per Aspect	Max Score	Score %	Criteria
Content Eligibility	103	120	85.8	Worthy
Inquiry Assessment	26	30	86.7	Worthy
Sains	9	10	90	Worthy
Total number	138	160	262.5	Worthy
Average	46	53.3	87.5	Very Worth It

According to media experts, the media developed after revision is very suitable for application in learning. In the cover design section, the material is already framed and when validated, the cover material is not easily damaged. Based on the module product developed, the following assessment results from the two media experts after revision can be seen in the table.

Table 5 Final Stage Media Expert Validation Results

Assessment Aspects	Number per Aspect	Max Score	Score %	Criteria
Graphic Eligibility	60	70	85.7	Very Worth It
Language Eligibility	34	40	85	Very Worth It
Graphic Aspects	49	60	81.7	Very Worth It
Total number	143	170	252.4	Very Worth It
Average	47.7	56.7	84.1	Very Worth It

According to the fourth grade teacher, the inquiry-based science module that has been developed is very suitable for use in learning. The product feasibility results from science teachers regarding the products that have been developed are as follows.

Table 6 Product Feasibility Results by Class IV Teachers

Assessment Aspects	Number per Aspect	Max Score	Score %	Criteria
Content Quality	23	28	82	Very Worth It
Media Display	11	12	91.7	Very Worth It
Technical Quality	13	16	81.2	Very Worth It
Total number	47	56	254.9	Very Worth It
Average	15.7	18.7	84.9	Very Worth It

Based on the results of student responses carried out in class IV SDN 01 Budi Lestari, there were 30 students. In this stage, the module used is a module whose deficiencies have been corrected according to validation results and suggestions from material experts and media experts. The results of student responses regarding the modules developed stated that students were very interested in inquiry-based science modules. So this inquiry-based science module is suitable for use as a learning medium, this can be seen in the attached table. After conducting a trial of assessing the feasibility of the product according to the class teacher in the science module, it met the module's feasibility criteria and based on a limited scale trial, namely a trial on 30 students of Public Elementary Cchool 01 Budi Lestari, the results were 87.3% with very feasible criteria. , thus the inquiry-based science module developed is suitable for use in learning.

At this stage the researcher found potential and problems at Public Elementary Cchool 01 Budi Lestari, Tanjung Bintang District, South Lampung, namely problems in the classroom that the role of the teacher was still more dominant than the students, the teaching materials used were textbooks and modules but the modules used had no instructions for using the modules, glossary, competency standards, basic competencies. Apart from that, the modules used are less interesting, they are only informative, have no color, illustrations/decoration and image captions so that students are less motivated and quickly get bored. Apart from that, there is no science module specifically designed to discuss plant parts and their functions in detail through an inquiry approach.

After finding potential and problems, researchers collected data or information regarding the module teaching materials used by class IV teachers in the natural science learning process so far. The data obtained was then processed and used to develop modules using Microsoft Office Word 2010 software with an inquiry learning approach.

After the researcher has collected data, the initial steps taken by the researcher in creating the module design are as follows:

- a. Title/cover page
- b. Foreword
- c. List of contents
- d. Determine the paper size, font, spacing and type of letters
- e. Determine attractive colors and images to support learning
- f. Determine the writing structure
- g. Identify types of learning materials
- h. Selecting learning materials

The initial product of the inquiry-based science module which was developed in terms of material was to clarify the material and develop it based on inquiry learning so that students could actively participate in learning because students were given the opportunity to study independently in groups with or without guidance from the teacher. The material in the module developed by the researcher is also equipped with illustrations or picture descriptions that match the explanation of the content of the material and the characteristics of the

students. The initial product that was developed received an assessment from material experts with a percentage of 68.3% being deemed worthy. These results are an assessment of the product before revision. After the product was revised and then validated again, the assessment results from material experts experienced an increase in percentage from the initial percentage of 68.3% after the last validation to 87.5% with very feasible criteria. Thus, the science module developed was declared very suitable for use as a science learning medium based on the assessment of material experts.

The initial product of the inquiry-based science module which was developed in terms of design was to design the appearance of the module from the cover to the contents of the material with a more attractive appearance, namely by completing images and animations that were appropriate to the material. The initial product that was developed received a percentage of 72.8% from both media experts with appropriate criteria. These results are an assessment of the initial product before revision. The initial product that had been developed and before revisions were carried out experienced an increase in percentage from the initial percentage of 72.8% after the last validation to 84.1% with very feasible criteria. Thus, the science module developed was declared very suitable for use as a science learning medium based on the assessment of media experts.

Product feasibility testing is carried out after completing design validation. At this stage, the inquiry-based science module product that has been developed is then tested for feasibility on class IV teachers at SDN 01 Budi Lestari, Tanjung Bintang District, South Lampung. Products tested for feasibility by teachers obtained a percentage of 84.9% with very feasible criteria. The positive response given by students to the inquiry-based science module on plant parts and their functions is because the resulting inquiry-based science module product has several advantages, namely the description of the material is explained in detail accompanied by illustrations or picture descriptions, using simple language that is easy for students to understand, and its nature is interesting.

The percentage of results obtained interprets that the inquiry-based science module on plant parts and their functions was responded positively by students as teaching material that can be applied at SDN 01 Budi Lestari, Tanjung Bintang District. The final product is an inquiry-based science module on plant parts and their functions for class IV of SDN 01 Budi Lestari, Tanjung Bintang District, South Lampung, which has been completed. The process of developing inquiry-based science modules went through many stages with several problems experienced by researchers in developing them, including adapting material based on inquiry learning and module design based on student characteristics. By going through validation stages from material experts, media experts, and product feasibility assessments as well as student responses, the inquiry-based science module obtained very feasible criteria, so that the inquiry-based science module is suitable for use as a learning medium.

The development of learning media means that teachers can find and develop the learning media needed to improve learning outcomes by achieving learning goals and instilling character education, scientific literacy and competence in students [40]. The difference is that in previous research, learning media was developed in the form of inquiry-based digital pocket books to increase students' scientific literacy. In this research, researchers developed learning media in the form of inquiry-based science modules regarding plant parts and their functions. And this research also measures the responses of students and teaching staff in using this learning media. Based on the results that have been analyzed, it was found that students gave a positive response to the inquiry-based science module on plants and their functions because the resulting inquiry-based science module product has several advantages, namely the description of the material is explained in detail accompanied by illustrations or picture descriptions, using simple language that is easy to understand. students and their nature is interesting.

The implications of developing inquiry-based science modules regarding plant parts and their functions in elementary schools go far beyond the subject matter itself. This has the potential to shape the way science is taught, studied, and understood by young people, thereby growing a generation of curious and scientifically literate individuals. Limited generalization means that findings from implementing the module in one school or environment may not be generalizable to all educational environments. Factors such as school culture, infrastructure, and student demographics can influence results.

#### 4. CONCLUSION

In developing an inquiry-based science module on plant parts and their functions using the Research and Development model Sugiyono developed, the feasibility criteria were very feasible. This is demonstrated based on the assessment of material experts, media experts and teachers with the ideality of the material being explained in detail accompanied by illustrations or picture descriptions, the material is also explained using an inquiry approach, and the module contains information that increases students' knowledge. This is confirmed by the average assessment percentage of 87.9% for material experts, 84.1% for media experts, and 84.9% for teachers. So that the resulting module is suitable for use as teaching material. Researchers recommend further research by including elements of sustainability and environmental management in the module. Explore how



learning about the parts and functions of plants can increase ecological awareness and responsible behavior among students.

## ACKNOWLEDGEMENTS

The author would like to thank all parties who have provided support, assistance and inspiration in completing this research. Without their contributions, this research would not have been possible.

## REFERENCES

- [1] W. Khasanah, "Kewajiban menuntut ilmu dalam Islam," *J. Ris. Agama*, vol. 1, no. 2, pp. 296–307, 2021, doi: <https://doi.org/10.15575/jra.v1i2.14568>.
- [2] M. Fauzi, M. Y. Firdaus, and S. Vera, "Akhlah Menuntut Ilmu Menurut Hadis serta Pengaruh Zaman terhadap Akhlak Para Peserta Didik," *J. Ris. Agama*, vol. 1, no. 3, pp. 600–611, 2021, doi: <https://doi.org/10.15575/jra.v1i3.15375>.
- [3] V. Yana, M. Dani, and E. Purnomo, "Menumbuhkan motivasi belajar perspektif Hadits Sunan Ibnu Majah," *Tawazun J. Pendidik. Islam*, vol. 15, no. 3, pp. 369–378, 2022.
- [4] M. M. E. I. Bali and M. Musrifah, "The Problems of Application of Online Learning in the Affective and Psychomotor Domains During the Covid-19 Pandemic," *J. Pendidik. Agama Islam*, vol. 17, no. 2, pp. 137–154, 2020, doi: [10.14421/jpai.2020.172-03](https://doi.org/10.14421/jpai.2020.172-03).
- [5] A.-I. A. Z. Yahya, *Riyadhus Shalihin*. Jakarta: Pustaka Amani, 1999.
- [6] M. Hilmi, "Islamisasi Ilmu Pengetahuan: Pergulatan Pemikiran Cendekiawan Kontemporer," *Al-Adabiya J. Kebud. dan Keagamaan*, vol. 15, no. 02, pp. 251–269, 2020, doi: <https://doi.org/10.37680/adabiya.v15i02.268>.
- [7] Z. D. Rahmawati, "Penggunaan media gadget dalam aktivitas belajar dan pengaruhnya terhadap perilaku anak," *TA'LIM J. Stud. Pendidik. Islam*, vol. 3, no. 1, pp. 97–113, 2020, doi: <https://doi.org/10.52166/talim.v3i1.1910>.
- [8] A. Fuad, H. Karim, and M. Palennari, "Pengembangan Media Pembelajaran E-Magazine sebagai Sumber Belajar Biologi Siswa Kelas XII," *Biol. Teach. Learn.*, vol. 3, no. 1, pp. 38–45, 2020.
- [9] M. Harahap and L. M. Siregar, "Mengembangkan sumber dan media pembelajaran," *Educ. January*, vol. 10, pp. 1–10, 2018.
- [10] I. Magdalena, T. Sundari, S. Nurkamilah, N. Nasrullah, and D. A. Amalia, "Analisis bahan ajar," *Nusantara*, vol. 2, no. 2, pp. 311–326, 2020.
- [11] Mirawati and W. Sukarni, "Description of Student Attitudes : Enjoyment in Learning Physics and Interest in More Time Studying Physics," *SchrödingerJournal Phys. Educ.*, vol. 4, no. 1, pp. 1–6, 2023, doi: [10.37251/sjpe.v4i1.490](https://doi.org/10.37251/sjpe.v4i1.490).
- [12] A. Wahid, "Jurnal Pentingnya Media Pembelajaran Dalam Meningkatkan Prestasi Belajar," *Istiqra J. Pendidik. dan Pemikir. Islam*, vol. 5, no. 2, 2018.
- [13] F. P. Sinaga, Jurhana, Yusrita, and M. Hidayat, "Analisis Penggunaan Metode Mengajar (Metode Demonstrasi, Metode Eksperimen, Metode Inquiry, Dan Metode Discovery Di Sma Negeri 11 Kota Jambi)," *Relativ. J. Ris. Inov. Pembelajaran Fis.*, vol. 5, no. 2, pp. 103–110, 2022, doi: <https://doi.org/10.29103/relativitas.v5i2.7830>.
- [14] A. S. H. Mustaufiy, "Signifikansi Kontekstualisasi Bahan Ajar Bahasa Arab Bagi Penutur Non Arab," *AL-AF'IDAH J. Pendidik. Bhs. Arab dan Pengajarannya*, vol. 3, no. 1, pp. 35–46, 2019, doi: <https://doi.org/10.52266/al-afidah.v3i1.310>.
- [15] T. R. Padwa and P. N. Erdi, "Penggunaan E-Modul Dengan Sistem Project Based Learning," *J. Vokasi Inform.*, vol. 1, no. 1, pp. 21–25, 2021, doi: <https://doi.org/10.24036/javit.v1i1.13>.
- [16] J. Rahayu and E. Solihatin, "Pengembangan Modul Pembelajaran Online Pada Mata Pelajaran Kimia," *J. Ilm. Wahana Pendidik.*, vol. 5, no. 1, pp. 13–28, 2019.
- [17] A. Ekasari, "Application of E-Module to Identify Students ' Science Process Skills in the Practicum of Refraction on Prisms," *SchrödingerJournal Phys. Educ.*, vol. 4, no. 2, pp. 30–35, 2023, doi: [10.37251/sjpe.v4i2.502](https://doi.org/10.37251/sjpe.v4i2.502).
- [18] N. Latifah, A. Ashari, and E. S. Kurniawan, "Pengembangan e-Modul Fisika untuk Meningkatkan Kemampuan Berpikir Kritis Peserta Didik," *J. Inov. Pendidik. Sains*, vol. 1, no. 1, pp. 1–7, 2020.
- [19] J. Sopacua, M. R. Fadli, and S. Rochmat, "The history learning module integrated character values," *J. Educ. Learn.*, vol. 14, no. 3, pp. 463–472, 2020, doi: [10.11591/edulearn.v14i3.16139](https://doi.org/10.11591/edulearn.v14i3.16139).
- [20] T. W. Handayani, "Peningkatan pemahaman konsep IPA menggunakan model pembelajaran inkuiri terbimbing di SD," *Eduainment*, vol. 6, no. 2, pp. 130–153, 2018, doi: <https://doi.org/10.35438/e.v6i2.94>.
- [21] Darmaji et al., *PENDIDIKAN KARAKTER Dalam Pembelajaran Fisika Kurikulum 2013*. Jambi: Media Salim Indonesia, 2022.
- [22] M. Suendarti and V. Virgana, "Elevating natural science learning achievement : Cooperative learning and learning interest," *J. Educ. Learn.*, vol. 16, no. 1, pp. 114–120, 2022, doi: [10.11591/edulearn.v16i1.20419](https://doi.org/10.11591/edulearn.v16i1.20419).
- [23] E. C. Ramadanti, "Integrasi Nilai-Nilai Islam Dalam Pembelajaran IPA," *J. Tawadhu*, vol. 4, no. 1, pp. 1053–1062, 2020.
- [24] S. W. Octavia, Neni Septiani, F. Sinaga, and N. N. Qoidah, "Analysis Of The Relationship In Learning Interest To Learning Outcomes Static Fluid Material In Senior High School," *J. Ilm. Ilmu Terap. Univ. Jambi*, vol. 7, no. 1, pp. 22–26, 2023.
- [25] A. Rohmahtika and R. P. Wirayuda, "Identification of Honesty Behavior in Science Class XII Students of Senior High School," *Integr. Sci. Educ. J.*, vol. 4, no. 1, pp. 09–13, 2023, doi: [10.37251/isej.v4i1.310](https://doi.org/10.37251/isej.v4i1.310).
- [26] F. T. Aldila, E. F. S. Rini, S. W. Oktavia, N. N. Khaidah, F. P. Sinaga, and N. Sinaga, "The Relationship of Teacher Teaching Skills and Learning Interests of Physics Students of Senior High School," *EduFisika J. Pendidik. Fis.*, vol. 8, no. 1, 2023.
- [27] D. D. Romadona, "A Study of Student Science Process Skills : In Formal Change Practices," *SchrödingerJournal Phys.*



- Educ.*, vol. 4, no. 2, pp. 41–46, 2023, doi: 10.37251/sjpe.v4i2.503.
- [28] L. Hasibuan and A. Nugraha, “Development of Scientific and Constructivism-Based Handouts on Social Arithmetic Materials,” *Indones. J. Educ. Res.*, vol. 4, no. 2, pp. 28–31, 2023, doi: 10.37251/ijoer.v4i2.578.
- [29] I. L. L. Ping, L. Halim, and K. Osman, “Explicit teaching of scientific argumentation as an approach in developing argumentation skills, science process skills and biology understanding,” *J. Balt. Sci. Educ.*, vol. 19, no. 2, pp. 276–288, 2020, doi: 10.33225/jbse/20.19.276.
- [30] A. Raufi, “Pengaruh Gaya Mengajar Inkuiri dan Komando Terhadap Keterampilan Gerak Dasar,” *J. Inov. Penelit.*, vol. 1, no. 10, pp. 2191–2198, 2021, doi: <https://doi.org/10.47492/jip.v1i10.420>.
- [31] T. Sulistyarningsih, “Penerapan Metode Inquiry Learning dapat Meningkatkan Prestasi Belajar Bahasa Indonesia Siswa Kelas X IPA 1 SMA Negeri 2 Denpasar Tahun Pelajaran 2016/2017,” *Stilistika J. Pendidik. Bhs. dan Seni*, vol. 7, no. 1, pp. 110–127, 2018, doi: <https://doi.org/10.59672/stilistika.v7i1.100>.
- [32] K. Kasim, “Implementasi Model Pembelajaran Guided Discovery untuk Meningkatkan Aktivitas dan Hasil Belajar Peserta Didik SMA Negeri 2 Pekanbaru,” *Perspekt. Pendidik. dan Kegur.*, vol. 11, no. 1, pp. 50–56, 2020, doi: [https://doi.org/10.25299/perspektif.2020.vol11\(1\).4816](https://doi.org/10.25299/perspektif.2020.vol11(1).4816).
- [33] A. Sucita, “Pengembangan Modul Pembelajaran IPA Berbasis Inkuiri Terbimbing pada Materi Klasifikasi Makhluk Hidup Dikolaborasi dengan Permainan Teka Teki Silang, Untuk Siswa Kelas VII SMPN Kaur,” Bengkulu, 2021.
- [34] D. Susilowati, “Penelitian Tindakan Kelas (PTK) solusi alternatif problematika pembelajaran,” *J. Ilm. Edunomika*, vol. 2, no. 01, 2018, doi: <http://dx.doi.org/10.29040/jie.v2i01.175>.
- [35] M. Ramdhan, *Metode Penelitian*. Surabaya: Cipta Media Nusantara, 2021.
- [36] R. Tanjung, T. Ritonga, and E. Y. Siregar, “Analisis minat belajar siswa dalam pembelajaran daring pada masa pandemi covid-19 di desa ujung batu baru,” *J. MathEdu (Mathematic Educ. Journal)*, vol. 4, no. 1, pp. 88–96, 2021, doi: <https://doi.org/10.37081/mathedu.v4i1.2201>.
- [37] R. Yani, R. B. Anwar, and I. Vahlia, “Pengembangan Modul Matematika Berbasis Pendekatan Kontesktual Disertai QR Code Pada Materi Logaritma,” *J. Pendidik. Mat.*, vol. 11, no. 1, pp. 224–234, 2022.
- [38] S. Syarifuddin, J. B. Ilyas, and A. Sani, “Pengaruh Persepsi Pendidikan & Pelatihan Sumber Daya Manusia Pada Kantor Dinas Dikota Makassar,” *Bata Ilyas Educ. Manag. Rev.*, vol. 1, no. 2, 2021, doi: <https://doi.org/10.37531/biemr.v1i2.102>.
- [39] M. Qiftiyah, “Pengembangan Modul Pembelajaran Tematik Pada Tema Peristiwa Dalam Kehidupan Terintegrasi Dengan Ayat-Ayat Al Qur’an Kelas V MI/SD.” UIN Raden Intan Lampung, 2018.
- [40] H. Ariyanto, S. Utami, Ismaya, and E. Aditia, “The Development of Digital Pocketbook Media Based on Inquiry on Plant Growth Materials Elementary School Students,” *Uniglobal J. Soc. Sci. Humanit.*, vol. 1, pp. 9–16, 2022.