



Development of Plants Booklet in Cilongok District, Banyumas Regency as a Learning Supplement for Classification of Living Things for Junior High Schools

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Abstract

During the Covid-19 pandemic, learning at SMP Negeri 2 Cilongok was carried out online. Material for classification of living things is science learning material for class VII in the 2013 curriculum. The teaching materials used in the form of textbooks and Student Worksheets (LKS) are not able to help students understand the material and study independently because they have not utilized plants in the surrounding environment. The types of plants in Cilongok District, Banyumas Regency have the potential as a source of learning, but the use of plants as a source of learning directly requires a longer time. Therefore a learning supplement is developed that is easy to understand and easy for students to use for independent study, namely the Plants Booklet in Cilongok District, Banyumas Regency which contains pictures and descriptions. The research aims to identify plant species in Cilongok District, Banyumas Regency, to analyze the validity and readability of booklets as learning supplements. The method used is Research and Development (R&D) research. The booklet product trial was carried out at Cilongok 2 Public Middle School involving class VII F students and science teachers. Based on the results of the identification of plant species in Cilongok District, Banyumas Regency, 60 species were found that were relevant to be used as learning resources in Plantae material. The results of material and media validation in the booklet showed very good results with a percentage of material validation of 81.3% and media validation of 96.5%. The booklet readability test showed a high category with an average percentage of 83.3%. Based on the results of the study it can be concluded that the Plant Booklet in Cilongok District, Banyumas Regency was stated to be valid and easily understood by students to be used as a supplement to learning material on the classification of living things.

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INTRODUCTION

Classification of living things is one of the subjects of class VII science learning. The Basic Competency (KD) that needs to be achieved in learning that applies the 2013 Curriculum is KD 3.2 which is classifying living things and objects based on the characteristics observed and KD 4.2 which is presenting the results of classifying living things and objects in the surrounding environment based on the characteristics observed. The scope of material on classification of living things aims to train the ability to identify objects around us, distinguish living things from non-living things, and classify living things based on classification principles.

Based on the results of an interview with a class VII science teacher at Cilongok 2 Public Middle School which was conducted in January 2021, information was obtained that during the pandemic, learning was carried out online through Google Classroom. The number of class VII students at Cilongok 2 Public Middle School is between 32-34 people in each class and only about 50% of the total number of students have met the Minimum Completeness Criteria (KKM) score in the science lesson material on living things classification.

This achievement is suspected because in the learning process the teaching materials used are still very limited. Teachers only use textbooks and LKS during the learning process. Online learning also requires students to learn more independently, teaching materials that are less attractive make students less motivated to learn. According to Ami (2012), students tend to like interesting reading with little description and lots of pictures or colors. Images can increase reading interest and help readers imagine so as to help someone to improve memory.

Alternative teaching materials that can be used in the learning process referring to the 2013 curriculum include books, print media (booklets, leaflets, etc.), electronics and natural or relevant learning resources (Abadi, 2017). The learning process is also strongly influenced by learning resources. One source of learning that influences the learning process is the environment, especially the environment around students. Utilizing the closest environment can help students in the learning process to become more meaningful (Ikhsan, 2017).

The home environment is the closest source of learning to students. Most students of SMP Negeri 2 Cilongok live not far from school. The house environment around it still has a lot of open land and is used for planting various types of plants. Many types of plants can be found in the Cilongok District area, but identification of plant species in the Cilongok District area has never been carried out.

The types of plants that exist in the Cilongok District area have the potential to be used as a source of learning. Utilizing the student's closest environment can help students to carry out independent learning. Independent learning supports the learning process in the 2013 curriculum which emphasizes scientific approach, namely a learning model that uses scientific principles which includes a series of data collection activities through observation, questioning, experimentation, processing information or data, then communicating. However, using plants directly requires more time in learning so that learning time becomes longer and less efficient.

Therefore it is necessary to develop learning supplements that can present relevant plant species in learning material, easy to understand and interesting for students. One of the learning supplements that can be developed is teaching media in the form of booklets. Booklet is a learning medium that is used to convey

material in a concise form using attractive pictures. Until now there has been no development of learning supplements in the form of plant booklets in the Cilongok District area.

Booklets on the classification of living things can be an easy-to-understand and interesting learning supplement for students. The types of plants in Cilongok District, Banyumas Regency that are relevant can be used as objects of discussion that can help students to better understand material related to plants, one of which is material on the classification of living things. In material classification of living things, plants are divided into several divisions, namely mosses (*Bryophyta*), ferns (*Pteridophyta*), and seed plants (*Spermatophyta*). Based on the explanation above, it is necessary to develop a plant booklet in the Cilongok District, Banyumas Regency, which can be used as a learning supplement.

RESEARCH METHOD

The research method used in this research is the Research and Development (R&D) method which is modified from Sugiyono (2010). The modified research stages include potential and problem analysis, data collection, product design, product validation, product revision, small-scale trials, product revision, and the final product. In the data collection stage, identification of plant species relevant to the material was carried out, namely plants that could represent each division of *Bryophyta*, *Pteridophyta* and *Spermatophyta*.

Plant data collection was carried out in five villages in Cilongok District, Banyumas Regency. Determining the location of data collection using a purposive sampling technique by considering the location of the student's residence so that the location of data collection was carried out in the village closest to SMP N 2 Cilongok. Collection of plant data was carried out using exploratory survey methods. The types of plants were identified based on the results of morphological observations using the plant identification book of Java Mountain Flora (Van Stennis, 2010) and Indonesian Ornamental Plants (Hasim, 2009).

The booklet is first assessed by the validator before being tested further in a small scale trial. Booklet validation uses a teaching material assessment instrument from the 2014 BSNP. Material experts assess booklets based on four aspects, namely the dimensions of knowledge, language, presentation techniques, and completeness of presentation. Media experts assess booklets based on four aspects, namely aspects of size, cover design, content design and image aspects of the booklet contents. Subject teachers assess booklets based on three aspects, namely graphical aspects, material aspects and language aspects.

A small-scale trial was carried out at Cilongok 2 Public Middle School using a research sample of 10 students in class VIII F for the readability test and the remaining students in class VIII F for the response questionnaire. The research data taken were 1) the types and descriptions of plants that were relevant to the learning material, 2) the validity of the booklet aspects of the material, media and user practicality and 3) the level of readability by students. Measurement of the validity of material aspects was carried out by Talitha Widiatningrum M.Sc., Ph. D., the validity of the media aspect was carried out by Dr. Sigit Saptono M.Pd., and the practical aspects of the user were carried out by the science subject teacher Anik Dwi H. S.Pd and students of class VIII F. The research data were analyzed using quantitative descriptive analysis.

RESULT AND DISCUSSION

Identification of mosses (*Bryophyta*), ferns (*Pterydophyta*) and seed plants (*Spermatophyta*) in Cilongok District, Banyumas Regency

Based on the results of taking plant data in five villages in Cilongok District, Banyumas Regency, 60 relevant plant species were obtained as learning resources. These plant species are divided into 5 divisions namely *Bryophyta*, *Coniferophyta*, *Magnoliophyta*, *Marchantiophyta* and *Pterophyta*. Two species were found in the *Bryophyta* division, namely *Brachythecium rutabulum* and *Ptychomitrium dentatum*, both of which are mosses, while liverworts included in the *Marchantiophyta* division found one species, namely *Marchantia polymorpha*. In this observation, no hornwort species were found. The types of ferns are included in the *Pterophyta* division, there are five species found in this observation, namely *Sphaeropteris glauca* (Pakis monyet), *Asplenium nidus* (Paku sarang burung), *Platyserium bifurcatum* (Paku tanduk rusa), *Pyrrosia piloseloides* (Paku sisik naga), dan *Adiantum raddianum* (Paku suplir).

In the identification of seed plants (*Spermatophyta*) there are two divisions, namely the *Coniferophyta* division, there are two species *Platyclusus orientalis* (Cemara kipas) and *Pinus mercurii* (Pinus), and the second division, the *Magnoliophyta* division, obtained 50 species, some of which are *Dendrobium victoriae-reginae* (Anggrek dendrobium ungu), *Spathoglottis plicata* (Anggrek tanah), *Bambusa vulgaris* (Bambu kuning), *Andredera cordifolia* (Binahong), *Brucea javanica* (Buah makasar), *Hippobroma longiflora* (Bunga kitolod), *Ficus elastica* (Karet kebo), *Hemigraphis reptans* (Keji beling), *Ruellia angustifolia* (Kencana ungu), *Orthosiphon stamineus* (Kumis kucing), *Impatiens balsamina* (Pacar air), *Medinilla magnifica* (Parijoto), *Mimosa pudica* (Putri malu), *Calophyllum soulattri* (Slatri), and *Epiphyllum oxycetalum* (Wijayakusuma). The results of plant identification in Cilongok District, Banyumas Regency were then used as additional material included in the plant booklet.

Table 1 Relevant plant species

Division	Family	Species	Local Name	
Bryophyta	Brachytheciaceae	<i>Brachythecium rutabulum</i> (Hedw.) Schimp.	Lumut daun	
	Ptychomitriaceae	<i>Ptychomitrium dentatum</i> (Mitt.) A.Jaeger.	Lumut daun	
Coniferophyta	Cupressaceae	<i>Marchantia polymorpha</i> L.	Cemara Kipas	
	Casuarinaceae	<i>Platyclusus orientalis</i> (L.) Franco	Pinus	
Magnoliophyta	Acanthaceae	<i>Casuarina</i> sp	Keji Beling	
		<i>Hemigraphis reptans</i> G. Forst.	Sambilata	
		<i>Hippobroma longiflora</i> (L.) G. Don	Ruellia Ungu	
	Balsaminaceae	<i>Ruellia simplex</i> C.Wright	Pacar air	
	Basellaceae	<i>Impatiens balsamina</i> L.	Binahong	
	Cactaceae	<i>Anredera cordifolia</i> (Ten.) Steenis	Wijayakusuma	
	Campanulaceae	<i>Epiphyllum oxypetalum</i> (DC.) Haw.	Kitolod	
	Clusiaceae	<i>Hippobroma longiflora</i> (L.) G.Don	Slatri	
	Fabaceae	<i>Calophyllum soulattri</i> Burm.f.	Putri Malu	
	Lamiaceae	<i>Mimosa pudica</i> L.	Kumis kucing	
	Marchantiaceae	<i>Orthosiphon aristatus</i> (Blume)	Lumut hati	
	Melastomataceae	<i>Medinilla magnifica</i> Lindl.	Parijoto	
	Moraceae	<i>Ficus elastica</i> Roxb. ex Hornem	Pohon Karet Kebo	
	Orchidaceae	<i>Dendrobium victoriae-reginae</i> Loher	Anggrek Dendrobium	
		<i>Spathoglottis plicata</i> Blume	Anggrek Tanah	
	Poaceae	<i>Bambusa vulgaris</i> Schrad. ex J.C.	Bambu Kuning	
	Simaroubaceae	<i>Brucea javanica</i> (L.) Merr	Buah makasar	
	Aspleniaceae	<i>Asplenium nidus</i> Linn.	Paku Sarang Burung	
	Pterophyta	Cyatheaceae	<i>Sphaeropteris glauca</i> (Blume) R.M.Tryon	Pakis Monyet
		Polypodiaceae	<i>Platynerium bifurcatum</i> (Cav.) C.Chr.	Paku tanduk rusa
<i>Pyrrosia piloselloides</i> (L.) M.G.Price			Paku Sisik naga	
Pteridaceae	<i>Adiantum raddianum</i> C.Presl	Paku Suplir		

Environmental conditions affect the diversity of plant species. The Cilongok District area is a wet climate area, dominated by tropical rain forest (Abimanyu, 2018). This is one of the supporting factors found in many species of seed plants and several types of mosses and ferns.

Seed plants are the main constituent of Indonesian tropical forests, the number of seed plant species in Java reaches 6,659 species (Widjaja, 2014) and continues to increase along with the discovery of new species and flora revisions for the next few years. Seed plants are widely distributed from the lowlands to the mountains with distinct flora in each zone (Willinghofer, 2012). The abundant diversity of seed plant (*Spermatophyta*) species makes it possible to find more seed plant species in various types of environments than other plant species such as ferns and mosses.

According to Laeto (2021) ferns are widely distributed in forest areas, and can be found both on the ground (terrestrial ferns) and attached to trees or rocks (epiphytic ferns). Terrestrial ferns like moist and shaded environmental conditions, but some grow in a fairly sunny and dry place on the side of the road (Salamah, 2020). Types of ferns have tolerance limits for varying environmental conditions in order to grow,

survive and thrive (Surfiana, 2018). Seeing the environmental conditions that are still outside the forest area, results of exploration for fern species are not found much.

Judging from the topography, the average height of Cilongok District from sea level is 225 meters above sea level (Abimanyu, 2018). According to Lukitasari (2018) height and topography factors can also affect supporting resources so that they can also directly affect the distribution and species diversity of a species including mosses. Moss plants (*Bryophyta*) can be found in various places such as boards, trees, rocks, wood and soil that has high humidity (Lukitasari, 2018). Although it can be found in various places, according to Putra (2015) microclimatic conditions, especially light intensity, air humidity, ambient temperature, and vegetation type affect the diversity and abundance of mosses. There are three species of moss plants (*Bryophyta*) found from exploration results, of the three species of moss plants (*Bryophyta*) divided into mosses (*musci*) and liverworts (*marchantiales*).

Mosses can survive bad conditions, such as dry seasons and can still live on sandy soil (Endang, 2020). This is also supported by Fajriah (2018) which states that some mosses live in dry places, can even withstand drought for years and are not damaged. Therefore, more types of mosses are found than types of liverworts.

The Validity of the Plant Booklet in Cilongok District, Banyumas Regency

The plant booklet is validated by material experts, media experts and subject teachers. The validity test assessment by material experts on booklets obtained an average percentage value of 81.3%. The highest percentage score was obtained for the linguistic aspect and the completeness of the presentation with a percentage value of 87.5% which was included in the very good category, while for the knowledge and technical aspects of the presentation, the percentage value for the same was 75% which was included in the good category. Material experts consider that the material presented in the booklet is in accordance with reality and does not give rise to many interpretations. According to Ramadhanti (2016) ambiguous sentences will lead to ineffective sentences and can damage the structure of the language used. In the contextual component, the material is also considered to have actually been presented in accordance with the development of science. The linguistic aspect is considered to have used language that is easy for students to understand and in accordance with the rules of Indonesian. The technical aspects of the presentation are sufficient in accordance with the systematic presentation and presentation order. The completeness aspect of the presentation of the booklet is also considered to be quite complete.

Table 2. The value of the validity of the plant booklet in Cilongok District, Banyumas Regency

No	Validator	Validity Value (%)	Category
1	Theory	81,3	Very good
2	Media	96,5	Very good
3	Subject teachers	88,9	Very good
Average percentage		88,9	Very good

Based on the results of the average percentage value of material validity of 81.3%, booklets are considered valid in the very good category (Table 2). According to Arikunto (2010) the achievement level of 80% to 100% is in the very good category, while according to Sugiyono (2016) the 76% to 100% category is

in the very good quality category. This is in line with the results of Sarip's research (2022) that procedurally and theoretically booklet teaching media are valid to use as teaching media to study Biodiversity material with an average score of 85.34% and is in accordance with research.

The media expert's assessment of the validity of the booklet obtained an average percentage of 96.5%. The highest percentage value is 100% in the aspect of assessing the size of the booklet, the design and topography of the booklet cover and the image aspect of the booklet content. The lowest percentage value is 87.5% obtained on the design aspect of the booklet content. Media experts consider that in terms of the size aspect the booklet design is in accordance with the size of the booklet content material, namely following the standard A5 book size (148 mm x 210 mm) with a tolerance for differences in size between 0 - 5 mm. The cover design aspect displays a good and clear point of view, the layout, title, author, logo, etc. are arranged in a balanced way, in tune with the layout of the content. The letters used on the cover are also attractive and easy to read, using simple letters so they are more communicative. According to Fadli (2017) the use of font size or letter size in a media is expected not to use a font size that is too small in order to make it easier to read the writing.

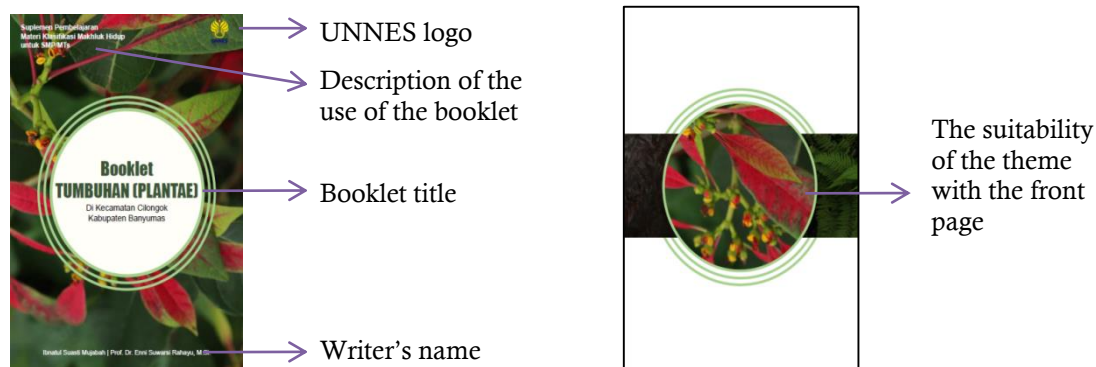


Figure 1. The final product of the front cover and back cover of the booklet

Based on the results of the average percentage value obtained from the assessment of media experts, 96.5% of the booklets were considered valid in the very good category (Table 2). According to Arikunto (2010) the level of achievement of 80% to 100% is in the very good category, while according to Sugiyono (2016) the 76% to 100% category is in the very good quality category. This is in line with the results of Putri's research (2022) the results of validation of enrichment materials by 3 validators obtained validity results of 93.47% with very good criteria.

The subject teacher's validity assessment of booklets obtained an average percentage score of 88.9%, which was in the very good category (Table 2). The subject teacher considers that the booklet has an attractive layout to read, the text display is clear so that it is easy to understand and the display of pictures/photos is clear on the graphic aspect. Material that has lots of pictures to explain the material briefly is the appropriate material included in booklet media (Darlen, 2015). Material aspects have subject matter that is arranged quite systematically equipped with appropriate examples and pictures. According to Paramita (2019) booklet media that can support learning objectives can be achieved and effective must be arranged systematically. The use of booklets also brings benefits and minimizes costs and time for learning. The language aspect already uses language that is quite understandable and creates a feeling of pleasure when students read it.

The results of the assessment carried out by material experts, media experts and science subject teachers at Cilongok 2 Public Middle School each obtained a percentage value of more than 80% which indicated a very good category. Based on this assessment it can be stated that the plant booklet has reached the eligibility standard of teaching materials according to BSNP (2016) so that it can be tested on students.

Readability of Plant Booklets in Cilongok District, Banyumas Regency

Booklets that have been declared valid through validity tests by material experts, media experts and subject teachers are then carried out with a small-scale test to determine the level of booklet readability. The small-scale test was carried out by giving a written test in the form of a cloze test which was given to 10 students of class VIII F of SMP Negeri 2 Cilongok using gap questions. Students who became research respondents were divided into students with high, average, and low ability levels. The average percentage value obtained is 83.3% in the high category. Based on this research, booklets can be used by students with high to low abilities as indicated by the acquisition of the average percentage of students with high to low ability levels of more than 60% and each of them is in high criteria (Table 3).

Table 3 The results of the legibility test of plant booklets in Cilongok District, Banyumas Regency

No	Student	Amount	Percentage (%)	Category
1	High ability level	3	97,7	High
2	Average ability level	4	86,7	High
3	Low ability level	3	64,4	High
Average percentage			83,3	High

This learning supplement is considered to be able to increase student interest in learning and increase knowledge for students with high ability levels, average ability levels and low ability levels. According to Sarip (2022) easy-to-understand learning media has attractive content, attractive designs and the use of simple sentences which tend to motivate students to learn repeatedly on material concepts that are considered difficult to learn independently. According to Pratiwi (2022) one of the advantages of booklet teaching media is that it is easier to use and can be carried anywhere so that it can help students study independently or in groups.

CONSLUCION

Based on the results of the study, it can be concluded that the results of identifying plant species in Cilongok District, Banyumas Regency found 60 relevant species to be used as learning resources in Plantae material. The plant booklet that was developed obtained the results of the material and media validity test which were in the very good category so that it was valid to be used as a learning supplement. The readability level of plant booklets is in the high category so that it can be stated that booklets are easy to read and understand as learning supplements by students.

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