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Practicality of popular scientific books on herbs of Tabanio coastal forest, Tanah Laut Regency, Indonesia

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Abstract

A Popular Scientific Book (PSB), which mainly contains 12 species of herbs that grow in the Tabanio Coastal Forest, Tanah Laut Regency, has been compiled, but its practicality has not been determined. The research aims to determine the practicality of the book. The determination is based on the results of the readability test, implementation, and response to the PSB. The subject is a student who has taken a course in Higher Plant Botany (Phanerogamae). Readability was tested one on one by three subjects. Implementation was observed by 5 observers who assessed implementation by small groups (5 subjects) and also by field groups (10 subjects). The instrument is a questionnaire with 9 statements. Responses to PSB were also obtained from small groups consisting of 5 subjects and field groups with 10 subjects. The questionnaire instrument consists of 15 statements. The readability value is 94.23% or categorized as Very Good. The value of the implementation of expectations originating from the small group is 91.11% and the actual implementation of the field group is 92.22%. These two values are categorized as Very Good and seem steady. Expected response values and actual responses are 87.20% and 88.40%, respectively. Both of these response values are categorized as Strongly Agree and also steady. Based on the test results, overall this PSB is practically used with the consideration that any deficiencies found are always revised.

Abstrak

Buku Ilmiah Popular (BIP) yang konten utamanya 12 spesies herba yang tumbuh di Hutan Pantai Tabanio, Kabupaten Tanah Laut sudah disusun, tetapi kepraktisannya belum ditentukan. Penelitian bertujuan untuk menentukan kepraktisan buku tersebut. Penentuannya berdasarkan pada hasil uji keterbacaan, keterlaksanaan, dan respons terhadap BIP. Subjeknya adalah mahasiswa yang pernah mengambil mata kuliah Botani Tumbuhan Tinggi (Phanerogamae). Keterbacaan diuji satu lawan satu oleh tiga subjek. Keterlaksanaan diamati oleh 5 pengamat yang menilai pelaksanaan oleh kelompok kecil (5 subjek) dan juga oleh kelompok lapangan (10 subjek). Instrumennya berupa angket dengan 9 pernyataan. Respons terhadap BIP diperoleh juga dari kelompok kecil yang terdiri atas 5 subjek dan kelompok lapangan dengan 10 subjek. Instrumen angketnya terdiri atas 15 pernyataan. Nilai keterbacaan adalah 94,23% atau terkategori Sangat Baik. Nilai keterlaksanaan harapan yang bersumber dari kelompok kecil adalah 91,11% dan keterlaksanaan aktual dari kelompok lapangan 92,22%. Kedua nilai ini dikategorikan Sangat Baik dan terkesan ajeg. Nilai respons harapan dan respons aktual berturut-turut adalah 87,20% dan 88,40%. Kedua nilai respons ini terkategori Sangat Setuju dan juga bersifat ajeg. Berdasarkan pada hasil uji itu, secara keseluruhan BIP ini praktis digunakan dengan pertimbangan bahwa segala kekurangan yang ditemukan selalu direvisi.

A. Introduction

Tabanio is a village located on the west coast of South Kalimantan Province. In this village which is included in Takisung District, Tanah Laut Regency, there are coastal forests and mangrove forests which are included in the wetland group and are rich in plant and animal resources.

The presence of two types of forest that are very easily accessible and located around settlements in which there are students is certainly an advantage. In general, the forest is an asset in the world of education. In particular, both can be utilized as much as possible as a vehicle or infrastructure to facilitate learning, especially with regard to biology and life and biodiversity.

From the two types of forest, materials or teaching materials are prepared in accordance with scientific principles and learning objectives; for examples those related to plants (Hairiani et al., 2018; Putri & Dharmono 2018; Fajeriadi et al., 2019) or animals (Fauzan et al., 2020; Nugroho et al., 2019; Riefani & Soendjoto, 2021; Suga et al., 2022). To reach students, the materials are packaged in various forms of learning media. The media chosen must of course be compiled through good and correct procedures and then tested for validity (as in Rahman et al., 2020; Riefani & Mahrudin, 2020; Supit et al., 2021), practicality (as in Dharmono & Riefani, 2019; Fauzan et al., 2021; Jannah et al., 2022; Riefani et al., 2020), and their effectiveness (as in Dharmono & Riefani, 2019; Maulyda et al., 2022).

In response to the unavailability of learning media about forest resources, a popular scientific book (PSB) on herbs in the Tabanio Coastal Forest has been prepared. PSB was chosen because the rules for writing on this learning media are more flexible and do not seem rigid (see Fajeriadi et al., 2019; Nurlita et al., 2021; Panjaitan et al., 2021). PSB is also a complementary book or science add-on book and is not intended to replace textbooks that have been recommended by relevant agencies as official learning media. Herbs are one of the groups of plants that grow in the coastal forest of the village and are easy to reach and easy to observe, because the maximum average height is about 2 m from the ground.

This study aims to determine the practicality of the PSB. Determination of practicality makes PSB which is equipped with tasks towards critical thinking skills is of high quality. PSB functions not only as an interesting learning medium, but also as an intellectual medium.

B. Material and Method

Three parameters were tested to determine the practicality of the PSB, namely readability, implementation (expected and actual), and student responses (expected and actual). The subjects are students who have taken courses in Higher Plant Botany (Phanerogamae). Subjects were only involved in one test.

Readability was tested one-to-one. The research subjects were 3 students and the instrument was a 13-indicator-questionnaire sheet. Subjects can give a score of 1 on each indicator, if they consider the PSB element to be very illegible, 2 if it is not readable, 3 if it is very readable, or 4 if it is very readable. The average score which is then converted to the average value for each indicator is calculated by Formula 1.

$$P = \left(\frac{A}{B}\right) x\ 100\% \ldots\ldots\ldots\ldots\ldots \text{(Formula 1)}$$

In this case, P is the value of each indicator, A: the number of scores obtained by each indicator, B: the maximum number of scores expected for each indicator.

The results of the readability test are the average of the values of all indicators categorized qualitatively as in Table 1. The implementation test involved 5 observers. In the small group test, each observer assesses 1 subject who does the task. The result is the expected implementation value. In the field test, each observer assessed 2 subjects who did the task. The result is the actual implementation value.

The assessment instrument, both in the small group and in the field test, is a questionnaire consisting of 9 statements. On each statement, the observer can give a score of 0, if it is not implemented or 1, if it is done. The mean score converted to the mean value for each statement is calculated by Formula 2.

$$\overline{X} = \left(\frac{\Sigma X}{n}\right) x\ 100\% \ldots\ldots\ldots\ldots\ldots \text{(Formula 2)}$$

In this case, $\bar{X}$ is the average value of each indicator, x: the number of scores obtained by each indicator, n: the number of subjects involved in the implementation.

The results of the implementation test are the mean values of all indicators categorized qualitatively as in Table 1. Finally, student responses were obtained through an instrument in the form of a questionnaire with 15 statements. The score for each statement could be 1, if the subject strongly disagrees, 2 if disagree, 3 if unsure, 4 if agree, or 5 if strongly agree. The mean value of each statement, both for the small group and the field test, is averaged as in Formula 2 and categorized qualitatively as presented in Table 1.

The results obtained if the number of subjects are 5 (small group) is an expected student-response response, whereas if the subject is 10 (field test), the result is the actual student-response.

Table 1 Criteria and qualitative categories of readability, implementation, and student responses

Criteria (%)	Readability/ implementation category	Student response categories
80,00 – 100	Very good	Strongly agree
60,00 – < 80,00	Good	Agree
40,00 – < 60,00	Pretty good	Disagree
20,00 – < 40,00	Not good	Don't agree
0,00 – < 20,00	Very Not Good	Strongly Disagree

Note: The range of values according to Ramadhan et al. (2020)

C. Results and Discussion

The PSB that has been compiled is entitled Herbs of Tabanio Coastal Forest, Tanah Laut Regency. This book contains a description of the coastal forest, 12 species of herbs in this forest, as well as tasks that prioritize critical thinking skills according to Watson-Glaser (2002). These species are bayam duri (*Amaranthus spinosus*), jarak merah (*Jatropha gossipifolia*), jeruju (*Acanthus ilicifolius*), karamunting (*Rhodomyrtus tomentosa*), kirinyuh (*Chromolaena odorata*), meniran (*Phyllanthus niruri*), mikania (*Mikania micrantha*), pacar air (*Impatiens balsamina*), patikan cina (*Euphorbia thymifolia*), permot (*Passiflora foetida*), sentro (*Centrosema pubescens*), dan urang-aring (*Eclipta alba*). Critical thinking skills include inference (able to interpret information and formulate problems), assumptions (able to identify facts and make assumptions), deduction (capable of formulating solutions), interpretation (capable of drawing conclusions), and evaluation (capable of evaluating arguments).

1. Readability of PSB by students

Six of the 13 indicators scored 100% and the rest scored less than 100%. These results indicate that more than half of the aspects in this readability should be revised or supplemented. This effort needs to be made so that the PSB is called perfect, although for the time being the results of the PSB readability test by students have been categorized as Very Good (Table 2).

Table 2 states that the pictures and their explanations are two important aspects that should be used as a guide in the preparation of the book, including in this case the PSB. The presence of these two aspects makes it easier for the subject to understand a concept or material presented in the book. Khairoh et al. (2014) argues that books whose presentation is complete with interesting and entertaining pictures and colourful displays are preferred to be studied, understood, and remembered by students than books with material that prioritizes verbal. Katon (2020) emphasizes that illustrations (pictures) provide added value and of course must be adapted to the contents of the book. According to Supit et al. (2021), the graphic aspect (images/photos, writing, layout, design) plays an important role in the feasibility of teaching materials.

Table 2 Readability of PSB by students

No.	Readibility indicators	Students			Average (%)
		1	2	3	
A	**PSB display aspects**				
1.	The text is easy to understand.	4	4	4	100,00
2.	Image is clear or not blurry.	4	4	4	100,00
3.	There is a description on the picture.	4	4	4	100,00
4.	The images presented are interesting.	4	4	4	100,00
5.	The images presented are in accordance with the material.	4	3	4	91,67
B	**Aspects of PSB material presentation**				
6.	Explain a concept using illustrations of problems related to everyday life.	3	3	4	83,33
7.	Using everyday life examples.	4	4	3	91,67
8.	Encourage discussion with other friends.	3	4	4	91,67
9.	Relating to biological material.	4	4	4	100,00
10.	The presentation of the material is coherent.	4	3	4	91,67
11.	No sentence has a double meaning.	3	3	4	83,33
12.	The symbols or symbols in this popular science book are easy to understand.	4	3	4	91,67
13.	The terms used in this popular science book are easy to understand.	4	4	4	100,00
	Readability test value (%)			**94,23**	
	Category			**Very Good**	

Another aspect that is no less important and should also be used as a guide in the preparation of the book (implicitly shown in the statements in Table 2) is the integration of the material, the ease

with which the text or terms can be understood, as well as the provision of illustrations in the form of biological examples that are practiced in everyday life. The coherent material invites the subject to think systematically and understand the causal process, not a jumpy or even complicated process that often makes the subject think over and over again to understand the material. The continuity of the material is certainly balanced with texts or terms that are easy to understand and examples that are present or carried out in everyday life. Such texts or terms invite the subject to think practically, of course, with maintained rationality. Illustration serves to strengthen the memory of the material because the message and impression of the illustration is already stored in memory. In turn, the illustration stimulates the neocortical brain to think and captures the weaknesses and strengths of the illustration to further seek and find new solutions, ideas, ideas, or innovations.

Conceptual and easy-to-understand teaching materials make students enthusiastic in learning (Nuryasana & Desiningrum, 2020). The easy-to-understand teaching materials are presented in a coherent, systematic, interesting manner, and equipped with examples to explain them (Rofiqoh & Subyantoro, 2020; Utami et al., 2017) as well as pictures that match the original condition/form and also have clear descriptions. (Dharmono et al., 2019; Fauzan et al., 2021; Maulyda et al., 2020; Riefani, 2019; Riefani et al., 2020). The content and presentation of writing or teaching materials are interesting and easy to understand, if they meet general requirements and habits (Silaswati, 2018) and are in accordance with the level of ability and understanding of students (Riefani & Mahrudin, 2020).

2. Implementation of the use of PSB

Overall, both the actual implementation value and the expected implementation value are categorized as Very Good with the actual implementation value being slightly higher than the expected implementation value (Table 3). This shows that the PSB is easy to understand and can be implemented with reliable results by a larger number of subjects.

The note that needs to be answered or sought a solution is that two of the 9 statements show the actual implementation value which is actually lower than the expected implementation value. Both of these concerns the glossary and the use of PSB for observations.

Table 3 Implementation of the use of PSB

No	Statements	Implementation (%)	
		Expectation	Actual
1	Students read the opening section (table of contents, instructions, and explanation of contents)	100,00	100,00
2	Students read the introductory information	80,00	90,00
3	Students read descriptions of general information	60,00	80,00
4	Students pay attention to the pictures and their explanations	100,00	100,00
5	Students pay attention to the writing on the colored box	80,00	80,00
6	Students read facts about the concept of diversity	100,00	100,00
7	Students reading the glossary	100,00	90,00
8	Students use popular scientific books for observations	100,00	90,00
9	Students use popular scientific books when analyzing data	100,00	100,00
	Implementation test value (%)	**91,11**	**92,22**
	Category	**Very Good**	**Very Good**

With regard to the glossary, we argue that there are two contributing factors. First, the subject did not read the glossary because they already understood the terms presented in the PSB. This is certainly a natural thing because the subject has already taken a course in Higher Plant Botany. Second, the appearance of the glossary is unattractive or the definition of terms is inaccurate, confusing, or has multiple interpretations so that the subject simply skips or doesn't read it. This of course must be asked to the subject or at least it can be raised as a statement or explored through the form attached to the student response instrument.

A glossary is a concise dictionary or list of words/terms with explanations in a particular field (Big Indonesian Dictionary). The glossary is usually arranged in alphabetical order and placed as the closing part of the book. The glossary is important for students because it helps them find foreign words and enrich their vocabulary (Ernawati, 2018). Ade et al. (2021) suggest making a glossary in the form of a table so that it is neat and easy to read. Under certain conditions, according to

Saptiawan (2016), the preparation of the glossary involves experts from different institutions.

Two factors are also suspected to cause a decrease in the value of using PSB for observations. First, the subject is familiar with the series of steps that must be carried out along with the tools and materials that need to be prepared in the observation so that they do not require PSB. Second, there are other forms of media that contain the same methods and observation materials as those published by PSB. Subjects prefer to use the other guide instead of PSB because the guide is more suited to the wishes of the students, easier to carry, more practical to use, or cheaper. In addition, there is no risk or great expense if the media is damaged.

Learning media is a tool in the transfer of knowledge. The choice of its use depends on internal and external factors. Internal factors include user tastes and user preferences for challenges from the media. External factors include the practicality of using media, the breadth of content or features, and the availability of supporting resources.

3. Student Response to PSB

Although overall student responses were categorized as Strongly Agree and reliable between a few subjects and a large number of subjects, the response value to PSB was below 90% (Table 4). This value indicates that PSB still has shortcomings from various aspects. These aspects are related to the willingness and enthusiasm for learning, memory of lessons, breadth of insight, and creativity.

Table 4 Student response to PSB

No	Statements	Response (%)	
		Expectation	Actual
1	This popular scientific book makes me have a high will to follow the lesson	88,00	86,00
2	This popular scientific book makes me have a high willingness to use time as efficiently and effectively as possible to study	88,00	92,00
3	This popular scientific book makes it easier for me to understand the lesson	88,00	88,00
4	This popular scientific book makes me very interested and not bored	88,00	84,00
5	This popular scientific book made me not misunderstood	84,00	86,00
6	This popular science book makes me remember the concepts of study materials longer	92,00	86,00
7	This popular science book helps me solve problems in everyday life	88,00	94,00
8	This popular scientific book has broadened my horizons	92,00	88,00
9	Learning Higher Plant Botany with this inquiry model improves learning achievement	84,00	88,00
10	The Higher Plant Botany learning that was carried out increased the spirit of group work	84,00	88,00
11	Learning Higher Plant Botany with popular scientific books makes my ability to interpret problems better	88,00	82,00
12	Learning Higher Plant Botany with popular scientific books made my assuming skills better	92,00	94,00
13	Learning Higher Plant Botany with popular scientific books makes my ability to formulate problem solutions (deduction) better	84,00	90,00
14	Learning Higher Plant Botany with popular scientific books makes my argumentation skills better	84,00	90,00
15	Learning Higher Plant Botany with popular scientific books makes my ability to draw conclusions (inference) better	84,00	90,00
	Student response value (%)	**87,20**	**88,40**
	Category	**Strongly Agree**	**Strongly Agree**

Regardless of the shortcomings (provided that the deficiencies will always be revised), a completed form should be attached to the instrument. This list provides an opportunity for students to complain about PSB and provides a written reason why they have responded to disagree or disagree with one or more statements. More than that, this response is actually also part of learning.

Student responses as subjects accompanied by reasons stated in this form are of course highly expected. This is at the same time a solution to overcome the difficulty of bringing together different opinions in the revision of the PSB. According to Anwar et al. (2022), meeting the unique needs of various individuals is not an easy matter.

Any results in the completed form must be declared and treated positively. Even if there is a way of delivery that is not good or very critical, the PSB writer (whoever the person) must capture and respond with certainty to everything that is desired by the subject. This certainty led to great care during the revision of the PSB. Revisions are no

longer carried out on the principle of guesswork or the principle of trial and error.

D. Conclusion

Based on the results of the readability test, implementation test (which includes tasks related to critical thinking), and also student responses, this PSB is categorized as practical and can also be used to explore students' critical thinking skills in studying Higher Plant Botany (Phanerogamae) courses.

This research only comes to practicality. The effectiveness of this PSB also needs to be determined so that the feasibility of the PSB can be accounted for. It is recommended that the instrument is equipped with a form that can be used to accommodate complaints and reasons for the subject to give a score that can be categorized as low.

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