



The Validity of the Gastropods Popular Scientific Book in the Pulau Sembilan Kotabaru Coastal Area

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Abstract

The cognitive abilities of Indonesian students are still low based on The Learning Curve in 2013. The quality of education should be improved. Most Indonesians live in coastal areas, and use snails as alternative dishes. Therefore, snails in coastal areas can be used as a source of learning. Interest in reading Indonesian students is low, so an interesting and easily understood book need to be developed. Then, a draft of the Popular Scientific Book (PSB) was made based on Gastropod Diversity in Coastal Areas. This research is the early stage of development, namely the validation of PSB. The purpose of this research is to test the validity of the product. Validation is done with three experts by giving a validation sheet of PSB. Validation data were analyzed categorization descriptively. Suggestions and comments from validators become the reference for product revisions. Validation complete when obtaining minimum category valid. The results showed coherence; legibility; active and passive sentences; method; applications and implications; definitions and explanations; and other styles the device obtains very valid category. Vocabulary; avoid dubious words; and the format obtains a valid category. Based on the results, the book developed have met the rules of popular scientific writing.

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INTRODUCTION

The ASEAN Economic Community (AEC) is an opportunity for competition between ASEAN members. Each country must prepare the best resources to face the competition, including by producing educational graduates who have competitiveness. Indonesia's National Education Standards regulate the path of education programs in Indonesia to ensure the quality of education. Graduates of education in Indonesia based on these standards are expected to have the ability of superior attitudes, knowledge, and skills. In particular, one of the abilities that science graduates must possess is critical thinking. However, the results of the 2013 Learning Curve mapping show that Indonesia was only ranked 37th out of 40 countries in the Cognitive Skills field (Baswedan, 2014). Cognitive Skills can be improved by applying environment-based contextual learning to students (Mulyana, 2009; Yamin, 2013). Therefore, it is necessary to develop tools or parts of learning tools that are environmentally based students.

Providing insight into the environment through learning can be done by developing the environment-based Popular Scientific Book (PSB). According to Dalman (2014), PSB is written in sentences that are easy to understand and not bound to the rules of scientific writing so that it attracts students' reading interest and is easily understood by students. PSB development has already been carried out, including by Widyaningrum (2015) who developed PSB from the results test of the Effect of the Sambung Nyawa Leaf Squeeze (*Gynura procumbens* (Lour) Merr) on Cholesterol Levels of Mice (*Mus musculus* L.) and their Utilization, and by Maharani (2016) who developed PSB from the results of the Methanol Fraction Test and N-Hexane Bintaro Leaf Extract (*Cerbera Odollam* G.) on the Mortality of Grayak Caterpillar (*Spodoptera litura* F.) and their Utilization. The Popular Scientific Book developed by both of them obtained a very valid category to be used as a public reading book.

The PSB research above shows that the environment has great benefits for the community, but in reality, not all people know it. Especially geographically Indonesia is the largest archipelagic country with the fourth longest coastline in the world. These conditions make Indonesia have a high level of biodiversity. In addition, Indonesia's sea has become an important center of world marine biodiversity (GreenPeace, 2013).

In 2010, 80% of Indonesia's population were in coastal areas (GreenPeace, 2013). The outermost islands of South Kalimantan Province which are still rarely visited are Pulau Sembilan District, Kotabaru Regency. Environmental conditions that are still beautiful make their biodiversity still preserved, one of which is gastropods (snails) which are abundant along the coastline of the islands. Twelve species of snails were found from the order of Archaeogastropod in the eulitoral zone of Pulau Sembilan Kotabaru (Fajeriadi *et al.* 2017). Further surveys found 10 types of snails from the order of mesogastropods and neogastropods in the coastal area of Pulau Sembilan Kotabaru. These snails are used by the local community as a substitute for fish when the season is difficult to fish.

The types of snails and knowledge of the community were used as information to develop the PSB entitled "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru". Popular Scientific Books developed not only intended for the community but also adapted to the characteristics of environmental learning that encourage critical thinking activities, so that high school students can use it for Biology science subjects, on the concept of Biodiversity.

RESEARCH METHOD

This research is development research focused on product design validation in the prototyping phase, which is limited to expert review. The validation of the PSB involved three experts who meet the criteria of biologists, have teaching abilities and plan to learn. Validation aspects and indicators refer to Rakedzon & Balam-Tsabari (2016), that is Coherence; Legibility; Vocabulary (expression, work, choice, and excessive); Active and Passive Sentences; Avoiding Doubtful Words; Format; Method; Application and Implications; Definition and Explanation; and Other Styles of Devices (narration, humor, and analogy). Validation results are used for the design revision process if there are still weaknesses and weaknesses. This stage lasts until the PSB at least meets the valid category. Data analysis techniques were carried out in quantitative descriptive. Data obtained from the three validators was taken on average. The average validation value is then categorized based on Laurent (2011) in Suryani *et al.* (2017).

RESULTS AND DISCUSSION

The validity of PSB "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru" was obtained from an expert review. The cover design can be seen in Figure 1, table of contents in Figure 2, and the results of expert review in Table 1.

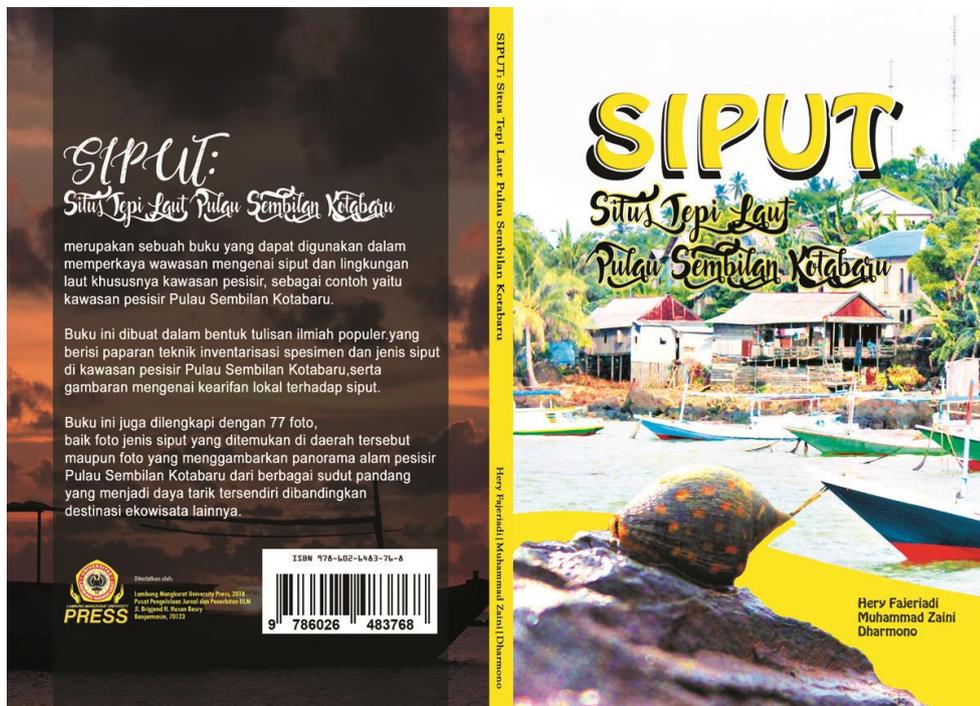


Figure 1 Cover PSB "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru"

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Figure 2 Table of Contents PSB "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru"

Table 1 Results of PSB Expert review

No.	Aspect (Base on Rakedzon & Balam-Tsabari, 2016)	Average Score	Validity Category (Base on Laurent, 2011 in Suryani <i>et al.</i> 2017)
1.	Coherence	3,8	Very valid
2.	Legibility	4,0	Very valid
3.	Vocabulary: expression, work, choice, excessive.	3,5	Valid
4.	Active and passive sentences	3,7	Very valid
5.	Avoiding doubtful words	3,3	Valid
6.	Format	3,0	Valid
7.	Method	3,7	Very valid
8.	Application; implications	4,0	Very valid
9.	Definition and explanation	4,0	Very valid
10.	Other styles of devices: narration, humor, analogy	3,6	Very valid

Based on the results of the validation in Table 1, it can be seen that the seven aspects of assessment obtain a very valid category, and three aspects of assessment obtain a valid category. Validators suggest ranking the concepts from general ideas to more detailed specific ideas. Suggestions related to shortcomings and weaknesses from the results of expert review have been corrected.

The coherence of PSB obtained a very valid category even though there were a few shortcomings, but it was fixed. Coherence in writing can make it easier for readers to understand the flow of material and can improve students' critical thinking skills. Prastowo (2015) explained that the book should contain main ideas, supporting material, examples of material, and conclusions. Eriyanti (2016) states that the coherence of sentences can encourage the thinking ability of the reader. Then Depari *et al.* (2017) complete it by stating that successive ideas are one of the determinants of writing quality.

The legibility of the PSB also obtained a very valid category. This shows that the PSB was developed according to the students' age level. PSB reading affects the achievement of understanding concepts from reading results. If reading is easy to understand, then the material is easy to understand, so that student learning outcomes and students' critical thinking abilities increase. According to Jatnika (2007), the readability of books is determined by two factors, namely language and form. Language includes word choice, wake up a sentence, and arrangement of paragraphs. It includes letters or typography which includes letter size, row density, and writing width. Purnomo *et al.* (2013) concluded that easily understood writing can improve students' cognitive abilities.

The vocabulary used in the PSB also needs attention. Vocabulary in popular scientific writing must be limited so that it is easy to understand, and must use a vocabulary that matches the interests of the reader. PSB's vocabulary gets a valid category. Lack of aspects of vocabulary has been corrected. This result is expected to increase the reading interest of Indonesian students who are still very low. Nukuhaly (2014) explains that if the text is not written according to the interests of the reader, it will cause the reader to feel difficulty in understanding the message and not attracting the reader.

The type of sentence in writing cannot be separated from consideration. PSB writing obtains a valid category in the aspects of the use of active and clear sentences. The material described in clear and convincing sentences makes students easy to decide on a problem. According to Sarwono (2010), popular scientific works are written using active sentence structures. Syafriah & Bachri (2017) stated the need for clearer and more convincing quotes in the development of writing. Depari *et al.* (2017) describes the use of active sentences needed in writing, especially in command of activities.

Besides using active sentences, PSB must be written with communicative sentences. Then, to strengthen the firmness of the description, the PSB must avoid doubtful words. The use of strict and unquestioning words in the PSB has a very valid category. Deficiencies in this aspect have been corrected according to the validator's suggestion. So, the description in the PSB can be easily understood and does not confuse students. Istiningrum *et al.* (2016) describing biology subject matter must be relatively easy for readers to understand. According to Artama *et al.* (2009) and Suyitno (2014), communicative sentences are preferred by readers and increase the readability of writing.

An explanation of the sentence is clearly explained. Besides sentences, there are other aspects that are also assessed. One of them is the PSB format. The format of writing PSB is related to coherence, which starts from the bottom line or main idea, followed by a more detailed supporting study. However, overall it is still not tied to the format of scientific writing so that it can be adjusted to the character of the author. This aspect of the PSB format has a valid category. According to Rakedzon & Baram-Tsabari (2016), popular science is written with a contrasting structure, starting with conclusions and underscores, and continued with information that is less important to the community. Yuliati (2013) previously also explained in the presentation of the science concept, teaching material begins with phenomena around students, then discussed from various fields of study so that students are easily understood.

The format of writing free PSB according to the character of the author is a major feature of popular scientific work. In order to embrace the broader reading interest of the community, in general, the PSB does not contain scientific methods. But there are times when scientific methods are included as a supplement, written briefly so that the interested public can try them. This aspect of the PSB developed has a valid category. This can be seen in the

prototype of the PSB "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru " which is equipped with a snail collection method. This method is made simple, combining scientific work with the habits of the local community. This method is important, especially for students to be able to carry out more meaningful environmental learning. According to Pusparini (2011), learning is more meaningful if students are actively involved in finding concepts from facts that exist in the environment through observation and experimentation. Regarding the loading of methods in PSB, Rakedzon & Baram-Tsabari (2016) state that methods are usually omitted or remain included but briefly.

In connection with simple methods that can be tried by the community and students in the PSB, it is necessary to have applications and implications that are consistent with the reality that occurs in the community. The application aspects and implications of PSB obtain a very valid category. This can be seen from the writing of the PSB which contains the problems and potential of the student's environment which can be included in learning activities and contains knowledge of the life of the local community, as well as other environmental issues that are studied scientifically. Therefore, the PSB developed can be applied in daily life, and its implications are in accordance with the local wisdom of the local community. According to Rakedzon & Baram-Tsabari (2016), the PSB application contains the problem and potential for its application in the real world of a study to the interest of the reader. Then, Ali (2016) states that the implications in speaking have meaningful dynamic knowledge of certain people's lives.

Good material exposure certainly produces good understanding. So, the definition and explanation need to be considered because it affects the reader's opinion on the concept in the PSB. The definition and explanation aspects in the PSB obtain a very valid category so that the material is easily understood by the reader. Material that is easy to understand can facilitate students in learning and improve student learning outcomes. According to Rakedzon & Baram-Tsabari (2016) definitions, explanations, examples, analogies, or metaphors are needed to facilitate readers' understanding. Ali (2016) states that metaphor is an effective element of literary works making it easier for the author to explain, describe, and interpret new things through other things that have been recognized previously.

In order to avoid language rigidity that often occurs in writing, then in the PSB a narrative containing fictional humor can be included. The narrative aspect of PSB obtained a very valid category. This can be seen in the writing of figures of speech and folklore in the PSB "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru". Sarwono (2010) describes popular scientific writing usually containing material described in the form of narration and non-standard writing. According to Istiningrum *et al.* (2016) narration is needed to convey the content of the material and is one aspect of the feasibility of writing a biology textbook.

Based on the description above, overall the PSB "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru" fulfills the PSB writing rules that are interesting and in accordance with the writing objectives. It is expected that this PSB can drive the reading interest of Indonesian students who are still low. The increase in students reading interest is expected to improve the cognitive abilities of Indonesian students who are still low based on the mapping of the 2013 Learning Curve. According to Antika (2015), an increase in reading interest is one of the variables that have an impact on improving students' cognitive learning outcomes.

CONCLUSION

The popular scientific book (PSB) "SIPUT: Situs Tepi Laut Pulau Sembilan Kotabaru" has fulfilled the rules of popular scientific writing. The aspects of coherence, readability, active and passive sentences, methods, applications and implications, definitions and explanations, and other styles of devices obtain very valid categories. Vocabulary aspects, avoiding doubtful words, and formats get valid categories. Based on the description above, this book has fulfilled the rules of popular scientific writing. The advantage of the PSB developed is the presentation of material that is interesting, easy to understand, and related to daily life, especially in the community of Pulau Sembilan Kotabaru. In addition, there is a simple method in the PSB that can be used for students or the community to conduct experiments directly into coastal areas.

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