

Validity Analysis of Popular Scientific Books Fish Type Diversity as Environmental Material for Vertebrate Zoology Course

Riya Irianti *, Mahrudin

Study Program of Biology Education, Departement of Mathematics and Natural Science Education, Faculty of Teacher Training and Education, University of Lambung Mangkurat, Banjarmasin City, South Kalimantan, Indonesia

*Corresponding Author Email: riyaiiriantipbiounlam@ulm.ac.id

Article Information	Abstract
<p>Keyword: Validity Analysis Popular Scientific Books Diversity Fish Vertebrate Zoological</p> <p>Kata Kunci: Analisis Validitas Buku Ilmiah Populer Keanekaragaman Jenis Ikan Zoologi Vertebrata</p> <p>History: Received : 30/04/2021 Accepted : 24/06/2021 Published : 28/06/2021</p>	<p>Validation of teaching materials is needed to see the suitability of the teaching materials developed with learning outcomes, so that these teaching materials are suitable for use in learning. One type of written work that can be used as teaching material is popular scientific books. Popular scientific books are used by students to increase knowledge about the material being studied. The purpose of this study was to analyze the validity of the popular scientific book Diversity of Fish Species as Enrichment Material for Vertebrate Zoology Courses. Descriptive quantitative research method, to find information on the validity of popular scientific books compiled based on research results. The subjects of the validity data are 3 validators (expert judgment). Data were analyzed descriptively. The results showed that popular scientific books were compiled for aspects of coherence 95.8%, readability 83.3%, vocabulary 87.5%, active and passive sentences 100%, systematics 83.3%, writing method 100%, applications and implications 100 %, definitions and explanations 91.67%, and other styles of devices 87.5%. Based on the results of the study, the average validity score was 92.13% with a very valid category.</p> <p>Abstrak</p> <p>Validasi terhadap bahan ajar diperlukan untuk melihat kesesuaian antara bahan ajar yang dikembangkan dengan capaian pembelajaran, sehingga bahan ajar tersebut layak digunakan dalam pembelajaran. Salah satu jenis karya tulis yang dapat digunakan sebagai bahan ajar adalah Buku ilmiah populer. Buku ilmiah populer dimanfaatkan mahasiswa untuk menambah pengetahuan tentang materi yang dibelajarkan. Tujuan penelitian ini adalah menganalisis validitas buku ilmiah populer Keanekaragaman Jenis Ikan Sebagai Bahan Pengayaan Mata Kuliah Zoologi Vertebrata. Metode penelitian deskriptif kuantitatif, untuk menemukan informasi validitas buku ilmiah populer yang disusun berdasarkan hasil penelitian. Subyek data validitas yaitu 3 orang validator (<i>expert judgement</i>). Data dianalisis secara deskriptif. Hasil penelitian menunjukkan bahwa buku ilmiah populer yang disusun untuk aspek koherensi 95,8%, keterbacaan 83,3%, kosa kata 87,5%, kalimat aktif dan pasif 100%, sistematika 83,3%, metode penulisan 100%, aplikasi dan implikasi 100%, definisi dan penjelasan 91,67%, serta gaya lain perangkat 87,5%. Berdasarkan hasil penelitian didapatkan untuk rerata skor validitas 92,13% dengan kategori sangat valid.</p>

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A. Introduction

Biology education in the learning process is closely related to living things. Contextual learning applied to biology learning helps teachers connect the material being taught to students' environmental situations and conditions, while encouraging students to make connections between their knowledge and its application in everyday life. According to Trianto (2010) the contextual approach is a learning concept that helps teachers relate the material being taught to students' real world situations. The contextual approach can also encourage students to make connections between their knowledge and their application in life as members of the family and community.

Johnson (2010), states that contextual learning aims to help students comprehend the meaning of the academic material they are learning by connecting it with their daily lives, both social and cultural. Biology education contributes to the world of education. A good example is on teachers who have the ability and skills in the field of wetlands. One implementation of this is to make objects in wetlands as learning resources in the form of teaching materials or learning media. These teaching materials can be used in their own institutions, especially universities and high schools, which will broaden their horizons about the object of study in learning.

One of the local potentials that can be used as a learning resource in the South Kalimantan area is the Nagara River. The Nagara River stretches from the highlands of Tabalong Regency, North Hulu Sungai Regency, South Hulu Sungai, and Tapin Regency to Barito Kuala Regency. Based on the results of interviews, the existence of this river is very critical for the community, especially for the people's daily lives. One of those needs is for the survival of living things. The importance of the role of this river is also included in the Law no. 5 of 1990 concerning the Conservation of Biological Natural Resources and Their Ecosystems, which state that rivers are life support systems for humans. Living things in the Nagara River are very diverse, especially vertebrate animals, one of which is fish.

The existence of various species of fish in the Nagara River has the potential to be an object of study that supports and enriches learning materials, especially in the field of biology. Local potentials used as learning resources can also enrich students' insight and knowledge on the object of teaching material, so that students can better understand the material taught in lectures. The introduction of the object of environmental study will also create a sense of love and responsibility for students towards the existence of living things in the environment and create a positive attitude which

encourages oneself and others to preserve the existence of different fish species in the waters. Referring to the opinion of Victorino (2004), the general characteristics of local potentials are: a) it exists in the environment of a community, b) the community has a sense of ownership, c) unites with nature, d) has a universal nature, e) is practical, f) is easy to understand using common sense, g) is a hereditary inheritance.

Based on the data collected during the initial observation, there were various species of fish that live in the waters of the Nagara river, one of which is the Cyprinidae family. The variety of fish species in this family is very diverse and is beneficial for the surrounding community as it can be used as a source of protein and adds economic value.

Studies on the Cyprinidae fish family have the potential to be integrated as teaching materials or learning media. Teaching materials that are appropriately designed and specifically arranged can help students in learning as an embodiment of the curriculum. Effective learning resources can come from a student-centered learning environment, in which it is closely related to everyday life and makes it easier for students to learn and comprehend the material. This kind of learning is the essence of contextual learning. Nurdyansyah (2015) stated that the benefits of teaching materials can aid students in carrying out learning activities. On the other hand, for educators, they can be used to direct all activities in learning. The form of learning resources consists of written and unwritten learning resources. Written learning resources are described as printed teaching materials. Several forms of printed teaching materials include popular scientific books, scientific books, modules, leaflets, booklets and photos or pictures.

According to the Ministry of National Education (2006), teaching materials are a set of materials that are systematically arranged, whether written or not, so as to create an environment or atmosphere that allows students to learn. Novana *et al.* (2014) stated that teaching materials which integrated local potentials can provide positive examples for students, and thus, the student learning activities are in accordance with the local potential of the region. Research on the development of fish teaching materials has been carried out by Hardiansyah and Mahrudin (2019) under the title of "the Development of Enrichment Teaching Materials for Wetland Ecology Courses in Wetlands in South Kalimantan Based on Fish Research Results Around Sirang Island, Riam Kanan Reservoir, Banjar Regency", which

produced teaching materials categorised in the very valid criteria.

Given the importance of broadening existing local knowledge and insights, the making of teaching materials are highly considered to be integrated with local potentials, so that the materials can be better understood by students and also easy to relate to. From the statement above, the researcher designed the "Popular Scientific Book of Fish Species Diversity" based on the local potentials of the learning resource, namely the Nagara River. The purpose of the developed BIP is to help students understand and develop their knowledge of Pisces material concepts.

This intrigued the researchers to conduct a research with the title of: "Analysis of the Validity of Popular Scientific Books on Diversity of Fish Species as Enrichment Materials for Vertebrate Zoology Courses". The researchers presumed that the teaching materials in the form of Popular Scientific Books can add insights and knowledge for students, especially regarding courses that contain local potentials in wetlands.

B. Materials and Method

This study is a research and development (Research and The Development). According to Sukmadinata (2005), research and development is a process or step to develop a new product, or a process to improve existing products that can be accounted for. Research and development is aimed to produce a product. The resulting product is in the form of teaching materials for the "Popular Scientific Book of Diversity of Fish Species" as enrichment materials for Vertebrate Zoology Courses.

The Popular Scientific Books that will be developed are first assessed regarding the references and syllabus. The framework of teaching materials within the Popular Scientific Books refer to Prastowo (2010). The research and development subjects in the validity test were three expert judges: 2 were lecturers of the Vertebrate Zoology course who were also zoology experts and the other was the teaching materials development lecturer who was also a development expert. The object of research is teaching materials in the form of Popular Scientific Books on Diversity of Fish Species as enrichment materials for Vertebrate Zoology courses.

The data of the Popular Scientific Book were analyzed by calculating the validity score from the expert validation results with the following formula:

$$V = \frac{TSe}{TSh} \times 100\%$$

Note:

V : Validity

TSe : Total validity score given by validators

TSh : Total expected maximum score

Source: Akbar (2013)

The results of the validity test of the known percentage are then matched with the criteria as accordance with Akbar (2013), as presented in Table 1 below:

Table 1 Validity test results according to the scores obtained

No	Score	Validity Category
1	85,01 %-100%	Highly valid, can be utilized without revisions
2	70,01%-85,00%	Valid, can be used with small revisions
3	50,01%-70,00%	Slightly valid, not suggested as it needs major revisions
4	01,00%-50,00%	Not valid, must not be used in any conditions

Source: adapted from Akbar (2013)

C. Results and Discussion

The Popular Scientific Books were developed under various aspects, such as the Potential Problems, Data Collection, Product Design, Product Design Revision, and Validation, with the aim of fulfilling the enrichment teaching materials that are expected to be in accordance with the RPS in 2017 for the Vertebrate Zoology course. The results of the validation tests on Popular Scientific Books consisted of 3 experts: 2 lecturers of the Vertebrate Zoology course and 1 lecturer for the Teaching Material Development course. The validity results of the final product, which is compiled from scientific journals, can be seen in table 2 below:

Table 2 Validation Test Results

No	Validity Aspects	Scores (%)
1	Coherence	95.8
2	Readability	83.3
3	Vocabulary: expressions, verbs, dictions which are overused	87.5
4	Passive and active sentences	100
5	Structural formats / Systematical	83.3
6	Writing method	100
7	Application and Implication	100
8	Definition and Explanation	91.67
9	Other device styles: narration, humor and analogies	87.5
Average validity scores		92.13
Category		Highly Valid

Based on the results of the validation test carried by the 3 experts, the results obtained a score of 95.8% on the coherence aspect of validity, which was categorised as highly valid criteria. The assessment of the coherence aspect is one of the four assessment indicators. Coherence means that

each paragraph has one main idea, the sentences are connected using connectors, sequential ideas, and these sentences have led to an understanding. This indicates that the teaching materials developed has coherent meanings and involve interrelationships between one part and another. According to Fajeriadi *et al.* (2019), coherence in writing can make it easier for readers to understand the flow of material and can improve students' critical thinking skills.

In the aspect of readability, the score obtained is 83.3%, which belonged in the valid criteria. This means that the developed Popular Science Book material is easy to read and understand, both in terms of sentence length, word choice, and layouts. Based on these results, it means that the teaching materials in Popular Scientific Book can attract the students' interest, motivation, desire and interest to read and learn about the materials in the developed Popular Scientific Book.

In the vocabulary aspect, the results obtained are 87.5% with very valid criteria. This means that the developed Popular Scientific Book teaching materials have a rich vocabulary and are in accordance with the scientific field and the level of cognitive abilities of students. This is supported by Khairroh *et al.* (2014) which states that a book can be said to be feasible if the vocabulary used is simple, light and short so that readers can more easily understand the content of the material or story. In the aspect of active and passive sentences, a score of 100% is obtained, which indicated highly valid criteria. This means that the Popular Scientific Books developed contain passive and active sentences which are in the correct structures and are used in accordance with the rules of writing.

In the aspect of formatting/systematics, the result obtained is 83.3% which belongs in the highly valid criteria. This means that from a systematic point of view, Popular Scientific Books have been systematically arranged to assist students in understanding the material in a sequential manner. This is in accordance with a study conducted by Belawati (2003) which stated that the coherence of the content of teaching materials makes it easier for students to learn while also guiding them to get used to thinking coherently.

Similarly, in the aspect of the writing method, a score of 100% is obtained, which showed that this aspect passed as the highly valid criteria. Thus, it can be states that Popular Scientific Books have been written appropriately and correctly in accordance with the writing method. In the aspect of application and implications, a score of 100% is also obtained, which means that it belongs to the highly valid criteria. This is caused by the fact that the Popular Scientific Books have included

applications and material implications in accordance with the students' daily lives. In accordance with the opinion stated by Sanjaya (2013) which explains that relevance is the connection of the learning content being studied with the curriculum and also in accordance with the needs of students? Therefore, the concept of relevance is very important to believe, in which students are motivated to learn it.

Additionally, this is in line with a research carried by Suparman (2012), which explains that there is relevance between the content of learning books and their implications for life. In the aspect of definition and explanation, a score of 91.67% of the results was obtained, which was categorised as the highly valid criteria. This is because the Popular Scientific Books that have been developed are equipped with a complete glossary to make it easier for students to understand technical terms that they may not know yet.

Moreover, each learning material also begins with a sentence definition and explanation. The developed BIP uses of definitions and explanations that is neither too short nor too long to make it effective to be read by the students. This is in line with Wibowo's statement (2008) which explains that BIP in written form in the description section contains words that are arranged to describe the details of an event, subject, or landscape objectively. This directs the reader as if they have seen the items directly through the text written in the book.

In other aspects of the style device namely narration, humor and analogy, the score of the validity test obtained is 87.5%, which is categorised in the highly valid criteria. This is because Popular Scientific books are also equipped with narrative aspects, humor and analogies in the explanations, as well as additional information in them. This is as reported by Wibowo (2008), that the form of narrative writing is to underline the storytelling aspect of a series of events which are related objectively or imaginatively within a certain period of time. This was done in the hope that the reader can appreciate the twists and turns of the story that has been assembled by the author.

The total average of the validity test result of the three validators obtained a score of 92.13%, which was categorised in the highly valid criteria. According to the standards, this means that the developed Popular Scientific Books have fulfilled all aspects which support learning objectives, and thus, can be used. This is supported by Hera *et al.* (2014) who states that the results of the validation of teaching materials with valid criteria indicate that the teaching materials developed are considered good quality and can be allowed to be integrated within classrooms.

Based on the results and discussion, the Popular Scientific Books teaching material which was developed procedurally and theoretically are highly valid to be used for the next test in development research, namely the readability/practicality test. However, there are several suggestion inputs from the research experts as revision materials for the improvements of Popular Scientific Books. This validation test was initiated to examine the weaknesses and/or the shortcomings of the products that have been developed. This material is then used as the basis for revising the initial product (draft I), so that later, draft II will be produced to be used in the next test stage.

D. Conclusion

Based on the results of the research and data analysis carried out, the drawn conclusion of this study states that the developed Popular Scientific Books on Fish Species Diversity as enrichment material for Vertebrate Zoology courses obtained an average score of 92.13, which was categorised in the very valid category. This validity test analyzed 9 aspects of assessments, namely: aspects of coherence, readability, vocabulary, active and passive sentences, systematics, writing methods, applications and implications, definitions and explanations, as well as other styles of devices. These aspects aid the researchers in declaring whether the first draft of the product is eligible to be continued in the next test.

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