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Developing Learning Resources Potential Analysis Textbook (APSB) Based on Research Results in the Scientific Field

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So far, students still survive using one source that they consider relevant. Thus it is necessary to have an up to date book developed from the results of the research. The research aims to produce procedures in examining potential of learning resources; to test the quality of APSB book; and to find out the effectiveness of the operationalization of APSB book. This development research uses a 4-D model (define, design, development, & disseminate). Preliminary testing was conducted on 12 students and field tests were conducted on 20 students. Product testing was carried out on 5 experts and product assessment by 21 students. Data collection techniques with documentation, questionnaires, and tests. Data analysis techniques were carried out in quantitative descriptive. The results show that: 1) the procedure for analyzing potential of learning resources consists of 5 stages: analyzing curriculum, determining material characteristics; ensure the relevance of the method; determine characteristics of students; and ensuring potential learning resources; 2) the quality of APSB book is based on expert's assessment of material aspects, presentation, and language, which is obtained as a good category, while display aspect is obtained very well. The results of student assessment of material aspects, presentation, and language were obtained very good categories, while display aspects were obtained good categories; and 3) the effectiveness operation of APSB book is indicated by an increase in the ability of student learning outcomes. The results of this study that the developed APSB book can be used as a reference in formulating potential learning resources from the research results.

Keywords: development, APSB textbooks, learning resources, potential, research result

INTRODUCTION

Learning is a series of teaching and learning processes in order to achieve learning goals. This learning goal will not be achieved properly without the right learning resources. Learning resources is the entire scope of material that is the object being studied. This learning resource can be a place or natural environment, objects, people, books, events or facts (Prastowo 2014:34–35).

In biology learning, the essence emphasizes the interaction between students and the object being studied. This interaction provides an opportunity for students to practice learning and understand how to learn, develop rational thinking potential, skills, and personality and recognize biological problems and their studies (Suratsih 2010). This learned object is known as learning resources.

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Learning resources are available abundantly in nature. Especially on biology subjects, the domain of study is in the form of living or non-living beings whose existence is very close to students, both invisible and invisible. Nevertheless, the vastness of the object of study of biology is not necessarily all learned, but every level of difficulty and depth of material are different. Therefore, the curriculum at each level is different.

In the use of the environment as a contextual learning resource it is felt more successful for the learning process to take place than other methods such as lectures (Hendarwati 2013; Syamsudduha and Rapi 2012). The use of natural potential as a learning resource can also be done directly (by utilization) or indirectly (by design). Directly means learning resources can be directly used as learning objects without having to develop them first. For example, a learning resource in the form of a river to study river ecosystem material, so that students can be directly assigned to observe the river. The indirect learning resources need to be developed/packaged first in the form of teaching materials or by using learning media in such a way that students can only use it for learning. For example, learning resources in the form of zoos to study vertebrate diversity are packaged in the form of leaflets.

The appointment of natural potential to be a source of learning has been studied by many students. However, students are often still confused about how to lift the potential of an area that contains these learning resources into teaching materials that are ready to use. In addition to similar problems about how to develop research results that have the potential to become learning resources into teaching material products. Based on the results of observations, students still need a lot of supporting references that are able to explain clearly and clearly how the flow must be taken.

So far, students still survive using one source that they consider relevant. Even though there is no explanation of the steps given in the reference, it is still limited to statements. Given that the results of the study are the result of thinking, initiative, creativity, and taste which is the answer to the previous hypothesis, which sometimes requires a long process, then research should not stop at one point, but must be sustainable. This is because the final goal of the research is to have a high usefulness value. Therefore, this study seeks to provide a solution to this problem, namely by developing a research manual that gambling outlines the best steps in bringing about natural phenomena/ symptoms into a powerful teaching material.

Review of Literature

The development of textbooks as a learning resource has been carried out by most researchers. As the results of research conducted by (Alabdulaziz and Higgins 2021; Suwito et al. 2020) that the use of textbooks that have been developed succeeded in increasing student achievement, compared to students who were treated with traditional learning. Digital learning resources are also a promising medium as well as learning resources, especially in this millennial era, where almost every student has a sophisticated and compatible gadget (Nawi et al. 2020).

Research relevant to the research appointed is also carried out by Munajah & Susilo (2015) about the potential sources of learning biology in class X high-level diversity material at the Gembira loka zoo. The results of the study showed that at the Gembira Loka Zoo there were 17 types of high-level plants that dominated. Based on the learning resource requirements which include clarity of potential, clarity of purpose, clarity of objectives, clarity of information revealed, clarity of exploration guidelines, and expected acquisition clarity, the results of the study can be used as high school biology learning resources class X, basic competency 3.2 2013 Curriculum on species diversity material.

The research conducted by Susilo (2014) about the analysis of the potential of high school biology teaching materials based on the local potential of the Gajah Wong river area in Bantul Regency. The

results showed that the potential of teaching material found in Gajah Wong rever was suitable for invertebrate animal classification material. From the results of the analysis it was also found that the teaching material had met the criteria as teaching material which included knowledge, attitudes, and skills. In addition, the results meet the principles of material development: relevance, adequacy, and consistency. The results of testing the quality of supplementary teaching materials show that supplementary books on teaching materials in the classification of invertebrate animals are deemed feasible in the good category.
Research on the development of Indonesia Syntax Textbook as a literature for high school students, in Indonesia has also been conducted by Wahyuni, Suwandi, & Slamet (2018) and also Komalasari & Saripudin (2018). The results of the study showed that the quality of the produced textbooks had a predicate worthy of being used as teaching material in schools in Indonesia. Significantly the textbook developed also has an impact on student achievement.

Based on the relevant research study, the specification of this development research lies in the development of a manual for the analysis of potential learning resources (APSB). This book is in the form of a print, functions as a support for student textbooks as well as in order to guide students' final assignments in experimental research and/or exploration of the study of potential learning resources, both from the results of existing research reports and new research that will be conducted. Specifically, the research aims to produce procedures in examining potential of learning resources; to test the quality of APSB book; and to find out the effectiveness of the operationalization of APSB book.

METHOD

This type of research is Research and Development (R&D). R&D is a process used to develop and validate educational product. The development steps include: product design, develop product based on the findings, test the product and revise it to correct deficiencies found during testing (Borg and Gall 2003). The procedural model used is a 4-D model (Define, Design, Development & Disseminate) that has been developed by Thiagarajan, Semmel, & Semmel (1974). However, this research is limited to the development stage. The dissemination stage was not carried out because the testing was still limited in certain areas. The dissemination stage is carried out to promote the resulting product development is accepted by the user by an individual, group, or system. The procedure for developing research in outline can be explained as follows.

Define

At this stage the researcher analyzes the need to develop the APSB book product based on the results of research in the scientific field. Things that are needed by identifying the results of research in the scientific field from the types of experimental research and exploration that lead to the development of new concepts/theories in biology learning. Next, collect some relevant studies and related references to formulate a draft concept of analyzing the potential of learning resources based on the results of research in the scientific field. Considerations used are based on: curriculum analysis, material depth analysis, and analysis of students who are the target of new scientific acceptance from the results of research in the scientific field. The term APSB itself stands for the term analysis of potential learning resources in Indonesian Language, "*Analisis Potensi Sumber Belajar*".

Design

At this design stage, several activities that will be carried out include: a) choosing a textbook format that will be created using predetermined material; and b) designing textbooks. The drafting of the textbook produced, at least includes: the title of the book, page editor, preface, table of contents, instructions for using books, overview, material in general about learning resources and their position, steps to analyze the potential results of research as a source of learning, closing, and bibliography.

Development

This development phase aims to produce revised textbooks based on expert input, the results of limited trials and field trials. Validation test aims to get advice, namely to find out the truth of the content and format and the implementation of the draft teaching material for improving learning materials through product validation activities that have been produced at the design stage. Expert validation is carried out by experts in the field of learning and science (which in this case is represented by biological science), the purpose of which is to determine the truth of the content and format of teaching materials developed by the researcher. Validation tests were conducted on 5 lecturers. After the draft teaching material is validated and revised, the revised results are then tested on students.

Preliminary testing carried out with 12 students with criteria: semester VII and have taken courses in developing teaching materials. The purpose of this limited test is to operate the developed teaching materials. The results of preliminary testing will be used as input or improvement for field tests. Field tests were conducted on 20 final semester students with the criteria: education students, who had taken the final assignment in the field of biological science. The final task is a type of experimental and/or exploration research.

Data collection techniques were carried out with documentation, questionnaires, and tests. Documentation techniques are used to design designs that are about the construction of the theory of composing mechanisms/procedures for analyzing the potential of learning resources based on the results of research in the field of science, as well as documentation when collecting data. The questionnaire technique is used to assess and validate APSB teaching book products in limited scale tests and field tests by test subjects and experts. Questionnaires use a Likert scale. The results of the questionnaire were in the form of a quantitative assessment in the form of a score given by the assessor and a qualitative assessment in the form of inputs and suggestions as an improvement material for the developed APSB book. The test technique is used to measure the effectiveness of the operationalization of the use of the APSB book. This test is in the form of an open-ended question in 12 questions which are then given to students in the field test. The pre-test and post-test questions are developed by following material, construction and language requirements. The answers of students in working on open questions will lead to more than one answer that is equally true or divergent (Subali 2012:65–67). The success indicator is measured from the results of student tests between before using the APSB book and thereafter.

The research data were analyzed descriptively qualitatively and quantitatively. Qualitative data analysis, in the form of assessment of book feasibility by expert and students. Inputs and suggestions provided as material for revising the book. Quantitative data analysis consists of: 1) book assessment questionnaire, data collected in the form of assessment scores obtained from students and experts (expert judgment). The categories used in the assessment are: very good (4), good (3), less (2), and very less (1). The data obtained is tabulated and data triangulation is conducted. The results of the assessment are then converted into product quality categories with guidelines according to the Directorate of High School Development (2010) in Table 1 as follows.

Table 1
Product quality category guidelines

Rating score (i)	Value	Category
Mi + 1,5 SDi ≤ x ≤ Mi + 3,0 Sdi	A	Very Good
Mi + 0 SDi ≤ x < Mi + 1,5 SDi	B	Good
Mi - 1,5 SDi ≤ x < Mi + 0 SDi	C	Less
Mi - 3 SDi ≤ x < Mi - 1,5 SDi	D	Very Less

Notes:

Mi	: Ideal Mean
SDi	: Ideal Standard Deviation
Mi	= 1/2 (ideal score max+ ideal score min)
SDi	= (1/2) (1/3) (ideal score max + ideal score min)
Ideal skore max	= ∑ item criteria x highest score
Ideal score min	= ∑ item criteria x lowest score

Thus, the conversion of the results of the assessment can be categorized as shown in Table 2 below.

Table 2
Conversion of expert and user (student) assessment results

Aspects of assessment	Score Interval	Value	Category
Material	$16.25 \leq \chi < 20$	A	Very Good
	$12.5 \leq \chi < 16.25$	B	Good
	$8.75 \leq \chi < 12.5$	C	Less
	$5 \leq \chi < 8.75$	D	Very Less
Display	$6.5 \leq x < 8$	A	Very Good
	$5 \leq x < 6.5$	B	Good
	$3.5 \leq x < 5$	C	Less
	$2 \leq \chi < 3.5$	D	Very Less
Presentation	$19.75 \leq \chi < 24$	A	Very Good
	$15 \leq \chi < 19.5$	B	Good
	$10.5 \leq \chi < 15$	C	Less
	$6 \leq \chi < 10.5$	D	Very Less
Language	$9.75 \leq \chi < 12$	A	Very Good
	$7.5 \leq \chi < 9.75$	B	Good
	$5.25 \leq \chi < 7.5$	C	Less
	$3 \leq \chi < 5.25$	D	Very Less

Analysis of the effectiveness of operations using the APSB book data collected in the form of pre-test and post-test results. The score of the test results was analyzed using excel program items to determine validity and reliability, then matched the difference between the pre-test and post-test values. Expect the results to be categorized.

FINDINGS

General Description of the APSB Book

APSB books are conventionally developed (printed), mini book, practical, economical, and easy to carry. In general, the contents of the APSB book contain: a) title, b) editor's page, c) introduction, d) table of contents, e) usage instructions, f) overview, g) general and concise learning source material, h) steps analysis of the potential results of research as a learning resource, i) closing, and j) bibliography.

Quality of the APSB Book

The results of the APSB book assessment by experts on the substance/material aspects, display, presentation, and language. The input provided is also accepted as a book improvement material.

These inputs include: the need for a more detailed explanation regarding the steps to analyze the potential results of the study as a source of learning, references need to be added, the presentation of images less enlarged, instructions for using the book more clearly, and some layouts that need to be improved so as not to cover. Based on the results of the assessment obtained the score as shown in Table 3 below.

Table 3
The results of the book assessment by experts

Aspects of assessment	Score	Value	Category
Material	16	B	Good
Display	6.8	A	Very Good
Presentation	19	B	Good
Language	9.4	B	Good

Assessment by students is carried out by 21 students. Assessment is aimed at the substance/material aspects, presentation, display, and language. Inputs provided include: the cover needs to be improved, the author's identity (bibliography) needs to be included, and typographical errors are still found. Based on the results of student assessment can be presented in Table 4 below.

Table 4
The results of the book assessment by students (users)

Aspects of assessment	Score	Value	Category
Material	17	A	Very Good
Display	5.7	B	Good
Presentation	20	A	Very Good
Language	10	A	Very Good

Assessments from experts and students can then be presented in Figure 1 below.

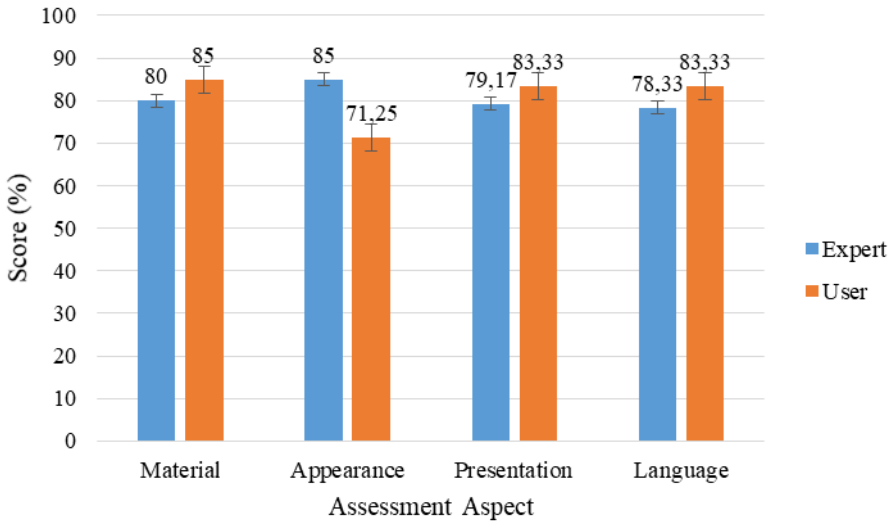

Figure 1
APSB book assessment diagram by experts and students (users)

Before field testing is carried out, the validity and reliability of the test instrument is conducted first. Based on the results of testing the reliability of the test obtained a score of 0.78, meaning the test has

high reliability. As according to Subali, (2016, p. 136) that the test item is declared valid is in the range 0.77-1.30. From testing the validity of the test questions, it was found that all the questions tested were valid and that nothing had to be discarded, but the questions needed to be slightly corrected and accepted. The results of testing the validity can be presented in Table 5 below.

Table 5
Validity and reliability test results

Items Num	Difficulty level		Standard deviation		Item Status
	Index	Interpretation	Index	Interpretation	
1	0.82	Easy	0.40	Index discrimination is quite good	Item Received Is Good
2	0.68	Medium	0.40	Index discrimination is quite good	Item Received Is Good
3	0.87	Easy	0.20	Index discrimination is poorly	Repaired item
4	0.57	Medium	0.27	Index discrimination is poorly	Repaired item
5	0.78	Easy	0.27	Index discrimination is poorly	Repaired item
6	0.63	Medium	0.33	Quite good discrimination index	Item Received but Repaired
7	0.42	Medium	0.27	Poorly discrimination index	Repaired item
8	0.33	Medium	0.27	Poorly discrimination index	Repaired item
9	0.00	Difficult	0.73	Quite good discrimination index	Item Received Good
10	0.00	Difficult	0.42	Quite good discrimination index	Item Received Good
11	0.23	Difficult	0.38	Quite good discrimination index	Item Received but Repaired
12	0.72	Easy	0.20	Poorly discrimination index	Repaired item

Notes:

Classification Difficulty level:		Classification of Discrimination		Item Status:	
0 – 0.3	Difficult	-1 < 0.2	Bad discrimination index	-1 < 0.2	Discarded item
0.3 – 0.7	Medium	0.2 – 0.3	Poorly discrimination index	0.2 – 0.3	Repaired item
0.7 - 1	Easy	0.3 – 0.4	Quite good discrimination index	0.3 – 0.4	Item Received but Repaired
		0.4 - 1	Good discrimination index	0.4 - 1	Item Received Good

Effectiveness Test Results for Operationalizing the APSB Book

Considering the results of the implementation of the field test, the various pretest and posttest scores were obtained. The difference in posttest and pretest values, hereinafter referred to as an increase in value. The increase in the distribution of students after being treated with the APSB book was obtained as presented in Table 6 below.

Table 6
Distribution of increase in value

Value increase interval	Number of students
$32.25 \leq \chi < 45$	5
$19.5 \leq \chi < 32.25$	8
$6.75 \leq \chi < 19.5$	5
$-6 \leq \chi < 6.75$	2

From Table 6, it is known that the highest increase in grades from 32.25 to 45 was experienced by 5 students. The range of increase in the highest value between 19.5 to 32.25 as many as 8 students, and the range of increase in the lowest value between -6 to 6.75 was experienced by 2 students. From the data it is known that there is a student whose value actually decreases after the posttest, which was originally 45 to 39. This is probably due to internal factors that are not good, or because of lack of learning.

Next, the average pretest value is 56.8 and the posttest value is 78.7. The percentage increase in the value of pretest and posttest was 38.56%. This result shows the effectiveness of the operationalization of the use of the APSB book. More details on the results of the study can be presented in Table 7 below.

Table 7
Summary of the research results

Aspect	Value	
Number of students	20	
Score	Pretest	Postest
Highest score	74	96
Lowest score	45	39
Average	56.8	78.7
% increase	38.56%	

Product Revision

In general, input from experts and students can be classified into 3 parts: input content/material, appearance, and writing. In terms of writing order, some typed words like the word "*berresiko*" to "*berrisiko*" have been corrected. In general, product improvements from these inputs are received and have been corrected as given input.

DISCUSSION

The final product of this research is a manual for analysis of potential learning resources (APSB). The goals of the current study aim to facilitate students in preparing their final assignments, in the form of experimental research and/or exploration of the analysis of learning resources both from existing and new research results. The specific purpose of the study is to: 1) produce procedures in examining the potential of learning resources from reports on research results in scientific fields packed in textbooks analyzing the potential of learning resources; 2) test the quality of textbook analysis of potential learning resources produced so that it can be used to become a student guide in preparing the final assignment; and 3) knowing the effectiveness of the operationalization of the use of the developed APSB book.

Besides being a guideline for reviewing the potential of learning resources, the APSB book is also equipped with a summary of the material as an illustration before conducting a potential analysis. However, this book is not appropriate if used as a textbook, but as a supplement. As according to

Susilo (2015), supplementary books are useful as supporters only or to supplement textbooks (handbooks).

The advantages of the APSB book developed include: 1) no need for lecturer monitoring to use the APSB book. Because the sentence is simple and not complicated, it makes it easier for students to use this book; 2) not only for students who want to do the final assignment, this APSB book can also be used by other students in learning about guidelines for analyzing potential learning resources; 3) this book is presented not only for students of biology education courses, but also for other study program students or researchers in general; 4) APSB books are practical and simple, can be carried everywhere easily, can be learned anytime anywhere.

Based on the results of the operationalization of the use of the APSB book, data were obtained that there was an increase in learning outcomes by 38.56% between students before and after using the APSB book. The score shows the effectiveness of the developed APSB book. Because the focus of this research is still on developing books, testing of other aspects of assessment is not carried out. Unlike research conducted by (Dwiyani 2017; Meliana 2017; Prihartina 2016; Yuningsih 2017), those who have developed modules to improve creative thinking skills, critical thinking, science process skills (KPS), or divergent thinking abilities of participants student.

As a form of implementation, the APSB book is more suitable for types of experimental and exploration research. As some researchers have done, such as Hasbiyati (2015) have conducted exploratory research on the utilization of tofu waste as a potential learning resource for science in environmental management materials. Eurika & Hapsari (2017) have also conducted exploratory research on the analysis of Na oogst's tobacco potential as a source of learning biology. Sativa (2015) conducts research on the development of biology module based on the results of experimental research from Yuningsih & Widyaningrum (2014). Research Enikanolaye, (2021) also shows that the positive impact of this multimedia can help reconstruct understanding and concretize learning. As an illustration of the estate, research on the development of supplementary books and learning modules from Susilo (2015) and Ridlo (2012) conducted research on local potential exploration. As a result, the quality of the products developed is declared feasible to be used as a source of learning in schools.

Research Limitations

Research into the development of the APSB book so far still has limitations. In terms of substance/material, the APSB book has limitations, which contain material that is concise, brief, and lacking in depth. Because, this book was deliberately developed in order to support student research regarding the guidelines for analyzing the potential of learning resources rather than being a textbook. The temporary APSB book is still a printed book (conventional), it has not become an interactive file or software that can be accessed anywhere at any time, as technological developments are increasingly present. In addition, the APSB book is more suitable as a supplementary book, not the main book as a guide for students or researchers.

CONCLUSION

Based on the results of the study it can be concluded that: 1) the procedure for analyzing the potential of learning resources consists of 5 stages: a) analyzing the curriculum (Core Competencies - Basic Competencies and Learning Objectives); b) determine the characteristics of the material to be taught; c) ensure the relevance of the method with consideration of material characteristics; d) determine the characteristics of local geographical background students; and e) ensuring the effectiveness of learning resources from the environment with consideration of aspects of relevance, adequacy, and consistency; 2) the quality of the APSB textbook based on expert judgment from the material aspects obtained a score of 16 with good categories, from the aspect of view obtained a score of 6.8 with a very good

category, in terms of presentation obtained a score of 19 with good categories, and from the language aspect a score of 9.4 with a good category . The results of student assessment in terms of material aspects obtained a score of 17 with a very good category, from the aspect of view obtained a score of 5.7 with a good category, from the presentation aspect obtained a score of 20 with a very good category, and from the linguistic aspect a score of 10 with a very good category; and 3) the effectiveness of the operation of the APSB book is indicated by an increase in the ability of student learning outcomes by 33.56%.

The results of this study that the developed APSB book can be used as a reference in formulating potential learning resources from the research results. The use of the APSB book will be more perfect with the support of adequate textbooks. As a recommendation for researchers, further research can be conducted to test certain aspects of assessment, such as student learning outcomes, level of thinking abilities, and others. In addition, further research is needed to obtain the generalization of the results of the research.

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