

Development of the Orchid Diversity Pocket Book in Mutis Natural Forest as a Student Learning Resource in Plant Botany Courses

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Abstract: This study aims to produce a product in the form of a pocket book on Orchid Diversity in the Mutis Natural Forest as a learning resource for fourth-semester students of the Biology Education Study Program, at the University of Timor in the Higher Plant Botany course. This study uses the development model of Borg and Gall which consists of ten stages, but in this study, it is only limited to 5 stages, namely conducting preliminary research (pre-survey), planning, developing product forms, conducting product trials, and make product revisions. The results of the validation by material expert validators and learning media experts showed that the pocket book did not require significant revision and the conclusion given by the material expert validator and media expert was that the Orchid Diversity pocket book in the Mutis Natural Forest was declared feasible to be tested on students. Based on the student questionnaire calculation data on individual trials and small group trials, it can be concluded that the Orchid Diversity pocket book in Mutis Natural Forest has not undergone significant revisions. After going through the validation stage by material expert validators and learning media experts as well as from the results of individual and small group product trials, the resulting Orchid Diversity Pocket Book in Mutis Natural Forest is valid and suitable to be used as a learning resource in the Higher Plant Botany course at the University of Timor.

Keywords: Development; Pocket book; Orchid.

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Introduction

Orchids are ornamental plants that are in demand by some people, especially women (Kurniasih et al., 2018). Orchid or Orchidaceae is one of the largest families of flowers (Wibawati et al., 2020). Orchids are popular not only because of the beauty of their flowers, but the variety of shapes and colors that can be a source of inspiration. This family can be found in almost every place in the world (Darmono in Pemba, et al, 2015).

The orchid tribe or Orchidaceae is a flowering plant tribe that has the most types. Although mostly found in the tropics, the types of orchids are also widely distributed from the wet tropics to the circumpolar. Orchids originating from the tropics include epiphytic

plants and live from rain, water droplets, dew, and moist air (Work America, 2019).

One of the orchid habitats that can be found in the province of East Nusa Tenggara is in the Mutis Natural Forest area. Mutis Natural Forest is one of the forest areas located at the foot of Mount Mutis, South Central Timor Regency, East Nusa Tenggara Province. Mutis Natural Forest has a fairly high diversity of plants because it has a humid condition that allows orchids to grow. Mutis Natural Forest is located at an altitude of about 2,500 meters above sea level (Wikipedia, 2022). During the orchid season, you can find orchids blooming on the tree trunks.

Orchid diversity can be used as a source of student learning in the Higher Plant Botany course. In the

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Higher Plant Botany course, there is a sub-chapter that studies Angiosperm Plants. Angiosperms are a type of flower plant, a flowering plant with the development of the fruit in a closed ovary or ovary (Little and Eugene, 1996). The importance of references to the diversity of orchids in the Mutis Natural Forest can support learning activities for the Higher Plant Botany course because students are provided with knowledge about the types of orchid plants found in the Mutis Natural Forest so that students are more familiar with the characteristics of each type of orchid plant that has been identified.

Therefore, it is necessary to develop a book containing information about the diversity of orchids in the Mutis Natural Forest. The book is a pocket book. According to the Big Indonesian Dictionary, a pocket book is a small book that can be put in a pocket and can be carried anywhere. Pocket books have the following characteristics: (1) Pocket books are generally 10 x 13 cm in size, can be placed in a pocket, (2) the contents of a pocket book must be light, (3) easy to carry everywhere, (4) small in size. thin (Tena, 2016).

Based on the above background, the author will conduct research entitled "Development of a Pocket Book on Orchid Diversity in Mutis Natural Forest as a Student Learning Resource in Higher Plant Botany Courses".

Method

This study uses a development model adapted from Borg and Gall (2003) which consists of ten stages, namely preliminary research, planning, initial product development, preliminary field testing, product revisions, main field trials, operational product revisions, operational field trials, final product revision dissemination, and implementation. This study uses the Borg and Gall model because it is systematic, has product clarity, and has clear boundaries, so it is more applicable. The development model used in this study is limited to five stages. The development stage consists of five stages, namely as follows. Conduct preliminary research, carry out planning, develop product forms, conduct product trials, carry out product revisions.

The development research procedure above is adjusted to the stages of using the needs and objectives so that it can be carried out according to the existing stages. The main field trials, operational field trials, final product revisions, dissemination and product implementation were not carried out. The development research procedure based on Borg and Gall (2003) in Saridewi (2019) is as follows.

Preliminary Research Stage

At this stage, an analysis of the needs of the fourth semester students of the Biology Education Study Program, University of Timor was carried out on

knowledge about the diversity of orchids in the Mutis Natural Forest and also interviews with lecturers for the Higher Plant Botany course at the Biology Education Study Program, University of Timor.

Planning Stage

At the planning stage, material selection is carried out, namely by analyzing the material to be developed, namely material about the diversity of orchids. The process of determining the material to be developed is through several considerations based on the background of the problem, studies of learning theory, and research results. The development of the orchid diversity pocket book takes into account the components of the relevant pocket book, resulting in a pocket book that is easy for students to learn. Analysis of the material on the development of reference books as follows: (a) Reviewing various sources related to the needs of the subject matter; (b) Analyzing the pocket book in terms of the correctness of language, facts, data, concepts, generalizations, the truth of the presentation of images, and the digestibility of the material.

In the preparation and writing of this subject matter, the focus is on the components of the pocket book, which is a textbook, so that it is easy for students to learn pocket books.

Product Development Stage

This activity aims to develop a pocket book on the diversity of orchids in the Mutis Natural Forest. The diversity of orchids written in this pocket book contains information about the names of orchids, both Indonesian (regional names) and Latin, types of orchids, orchid habitat, host plants (if epiphytic orchids), number of orchids, as well as information and benefits of orchids.

Product Trial Phase

The product trial was carried out after the product was declared valid by the three validator lecturers. The three validators are material expert validators (Orchid), and learning media expert validators (pocket books). The criteria used for the expert validator of Higher Plant Botany, expert validator of Orchid plant, and expert validator of learning media (pocket book) are as follows.

a. Material Expert (Orchid)

The appointment of an orchid plant expert is based on considerations, namely having knowledge about orchids and having conducted research on orchid plants.

b. Learning Media Expert (Pocket Book)

Determination of learning media experts (pocket books, namely lecturers who have the ability in the field of learning media development (at least have a Masters background who has taught more than 5 years), and who are still actively teaching both in private universities and public universities.

Product trials include individual trials, small group trials, and field trials. The subjects of the trials carried out in the research on the development of a pocket book on the diversity of orchids in the Mutis Natural Forest were as follows:

a. Individual Trial

Individual trial subjects consisted of five (5) fourth semester students, Biology Education Study Program, University of Timor who were taking Higher Plant Botany courses. Individual trials aim to identify the advantages and disadvantages of pocket books and obtain responses from students about the data contained in pocket books, namely in the form of material and content of reading texts and book presentations.

b. Small Group Trial

Small group trials were conducted on ten (10) fourth semester students, Biology Education Study Program who were taking Higher Plant Botany courses. The small group trial aims to check for errors that may have been missed in individual trials and to review the improvements that have been made from the results of individual trials.

Product Revision

The results obtained from validation by material expert validators (Orchid) and learning media expert validators (pocket books), as well as the results of individual trials, small group trials, and field trials, will then be used as a reference for revising the resulting pocket book. previously. Preparation of the final product development in the form of a pocket book. This product is the final result of a revision that is in accordance with the validation criteria, so that the product will later have relevance and is suitable for use according to the learning companion book in the Higher Plant Botany course.

Trial Design

The trial was carried out after the product was declared valid and feasible by the material expert validator (Orchid), and the learning media expert validator (pocket book).

Trial Subject

The trial subjects in this study were fourth semester students of the Biology Education Study Program, University of Timor, Academic Year 2020/2021, who were taking the Higher Plant Botany course.

Result and Discussion

The explanation of the research results from each stage is as follows:

Preliminary research

At this stage, an analysis of the needs of the fourth semester students of the Biology Education Study Program, University of Timor was carried out on knowledge about the diversity of orchids in the Mutis Natural Forest and also interviews with lecturers for the Higher Plant Botany course at the Biology Education Study Program, University of Timor.

The results of the needs analysis in the form of interviews with the caregivers of the Higher Plant Botany course at the Biology Education Study Program, University of Timor are as follows.

1. Based on the curriculum of the Biology Education Study Program at the University of Timor, the Higher Plant Botany course is in the fourth semester.
2. The latest curriculum changes, namely the Independent Learning Curriculum of the Independent Campus, the Higher Plant Botany course remains in the fourth semester, with a weight of 3 credits.
3. In the course of Higher Plant Botany, the types and characteristics of higher plants are studied, which consist of Gymnosperms and Angiosperms. While orchids are included in the Angiosperms.
4. During teaching the Higher Plant Botany course, the lecturer in charge of the course taught using teaching materials that were compiled by themselves with sources from various books and references from the internet. As long as the lecturer in the Higher Plant Botany course taught, he had taught specifically about Orchids but had not been detailed to the type. - existing types.
5. Lecturers who teach the Higher Plant Botany course feel it is necessary if students are provided with knowledge about the Diversity of Orchid Species in the Mutis Natural Forest, as one of the local plant species and related to the local potential of the Mutis area, North Central Timor Regency.
6. According to the Lecturer for the Higher Plant Botany course, so far there has been no book that contains material specifically on Orchid Diversity, especially Orchids around Mutis Natural Forest.
7. Based on the experience of teaching Lecturers in Higher Plant Botany courses have never had a pocket book as a source of learning, so there needs to be a pocket book on Orchid Diversity in the Mutis Natural Forest, as one of the learning supports, and Orchids are also an example of angiosperm plant species. which has high economic value and has other benefits.

In addition, the results of the needs analysis in the form of questionnaires distributed via Google Form to 10 students who have taken the Higher Plant Botany course are as follows.

1. Ten student respondents can describe the general morphology of orchids

2. According to 10 student respondents, the benefits of Orchids are as follows.
 - a. Cure stomach ache
 - b. Cure menstrual problems
 - c. Cure urinary tract infections
 - d. Cure joint pain
 - e. As an ornamental plant
3. In the Higher Plant Botany lecture, the lecturer in the course taught about the morphology of orchids in general, and did not study the types of orchids in detail.
4. Ten student respondents stated that they needed to learn about Orchid Diversity, for several reasons, including the following.
 - a. Orchid plants can be used as ornamental plants
 - b. Orchid plants have beautiful flower colors and can be sold so they have high economic value
 - c. Orchid plants can be used as a type of herbal medicine.
 - d. To increase knowledge about the types of orchids in Indonesia and their benefits.
5. The knowledge of 10 student respondents about pocket books is as follows.
 - a. A pocket book is one of the books that is used as a guide
 - b. A pocket book is a guidebook that has been simplified but still contains relevant information.
 - c. The pocket book is to meet the information needs in a concise, fast, flexible, and of course, does not take up much space on the shelf
 - d. A small book that can be kept in a pocket
 - e. A pocket book is a kind of small book that is easy to carry anywhere.
 - f. A pocket book is a small opening that can be put in a pocket so that it is easy to carry everywhere
 - g. A small book that can be stored in a pocket and easy to carry everywhere.
 - h. A pocket book is a book made for us students to be a guide for learning.

learning resource to increase knowledge about the types of orchids that grow around Mutis natural forest, North Central Timor Regency.

Based on the needs analysis of Lecturers of Higher Plant Botany, Biology Education Study Program, University of Timor and also 10 Biology Education Study Program students who have attended Higher Plant Botany courses, a pocket book on Orchid Diversity in Mutis Natural Forest is needed. Therefore, the research team carried out the next step, namely planning.

Planning

At the planning stage, material selection was carried out, namely by analyzing the material to be developed, namely material on orchid diversity, especially Orchid Diversity around Mutis Natural Forest. The design of the orchid diversity pocket book takes into account the components of the relevant pocket book, resulting in a pocket book that is easy for students to learn. In the preparation and writing of this subject matter, the focus is on the components of the pocket book, which is a textbook, so that it is easy for students to study pocket books.

Product Form Development

At this stage, the research team began to compile the initial draft of the pocket book. Furthermore, the research team gave a draft pocket book on Orchid Diversity in Mutis Natural Forest to the material expert validator, namely the Lecturer of Higher Plant Botany at Nusa Cendana University and also to the expert validator of learning media, namely the Lecturer of Learning Technology. The revised results of the two validators include quantitative data and qualitative data which are described as follows.

Quantitative data

The data on the results of the assessment of the validation instrument by validators of material experts and learning media experts (pocket books). While the data on the results of the instrument assessment by the material expert validator (Orchid), and the learning media expert validator can be seen in Tables 1 and 2.

Table 1. Data on Instrument Assessment Results by Material Expert Validators (Orchids)

Indicator	Evaluation		
	Percentage Validity (%)	Criteria	Response
<i>Content Eligibility</i>			
- The suitability of the material with the learning outcomes of the Higher-Level Plant Botany course	75.00	Valid	not Revised
- Conformity of material with indicators	75.00	Valid	not Revised
- Truth facts and concepts	75.00	Valid	not Revised
- Clarity of material delivery	75.00	Valid	not Revised
- Systematics of material delivery	75.00	Valid	not Revised
- Material equipment	50.00	Invalid	Revised

Indicator	Evaluation		
	Percentage Validity (%)	Criteria	Response
- Material attraction	75.00	Valid	not Revised
- The picture of the orchid presented is interesting and clear	75.00	Valid	not Revised
<i>Eligibility of language</i>			
- Suitability with students	100.00	Valid	not Revised
- Accurate use of the term symbol (symbol)	75.00	Valid	not Revised
- Clarity of use of words and language	75.00	Valid	not Revised
- The suitability of the use of sentences with Indonesian rules	75.00	Valid	not Revised
- Ease of understanding the flow of material	75.00	Valid	not Revised
- Coherence and coherence in the flow of thought	75.00	Valid	not Revised

Table 2. Data on Instrument Assessment Results by Validators of Pocket Book Learning Media Experts

Indicator	Evaluation		
	Percentage Validity (%)	Criteria	Response
<i>Serving Eligibility</i>			
- Presentation of material in accordance with the systematic writing	50.00	Invalid	Revised
- Presentation logic	75.00	Valid	not Revised
- Sequence of serving	75.00	Valid	not Revised
- Image presentation	50.00	InValid	Revised
- Completeness of pocket book structure	100.00	Valid	not Revised
<i>Graphic Eligibility</i>			
- Pocket book size	75.00	Valid	not Revised
- Use of letters	100.00	Valid	not Revised
- Use of color	75.00	Valid	not Revised
- Readability of sentence writing	75.00	Valid	not Revised
- The layout of the front and back covers is appropriate	75.00	Valid	not Revised
- The font size is proportional to the standard size	75.00	Valid	not Revised
- Consistent placement of layout elements	50.00	Invalid	Revised
- The use of letter variations is not excessive	75.00	Valid	not Revised

Qualitative data

Qualitative data from material expert validators and learning media experts (pocket books).

a. Validation Data Analysis by Material Expert Validators and Learning Media Expert

Data analysis was carried out based on the results of validation calculations by material expert validators and learning media expert validators (pocket books).

b. Data analysis Validation by Material Expert Validator

Based on the validation calculation data by the material expert validator, it can be seen that there is one item of the assessment criteria that is declared very valid, with a validity percentage of 100%; twelve items of assessment criteria were declared valid with a percentage of validity of 75%, and there was only one item of assessment criteria that was declared invalid, with a percentage of validity of 50% so that they had to revise correctly and fundamentally about the contents and presentation of the Orchid Diversity pocket book in Natural Forests Mutis.

Items that are declared very valid, with a validity of 100% are item number 9. Items that are declared valid, with a percentage of validity of 75% are items number 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, and 14. Items that were declared very valid indicated that the pocket book. The Orchid Diversity in Mutis Natural Forest is in accordance with the characteristics of students, while the items that are declared valid indicate that the Orchid Diversity pocket book in Mutis Natural Forest is in accordance with the learning achievements of the Higher Plant Botany course, there is conformity of the material with indicators, truth of facts and concepts appropriate, the material presented is clear and systematic, the material and images presented are also interesting, the use of terms, symbols (symbols) is appropriate, the use of words and language is clear, the flow of the material is easy to understand, and there is coherence and coherence in the flow of thought. The item on the validation instrument that is declared invalid with a validity percentage of 50% is item number 6, which indicates that the Orchid Diversity pocket book material in the Mutis Natural Forest is incomplete and must be revised properly.

Based on the data validation results by the material expert validator in terms of the feasibility of the book, it does not require significant revisions and the conclusion given by the material expert validator is that the Orchid Diversity pocket book in the Mutis Natural Forest is declared feasible to be tested on fourth semester students of the Biology Education Study Program, University of Timor.

Data analysis Validation by Learning Media Expert Validator

Based on the validation calculation data by the learning media expert validator, it can be seen that there are two items of assessment criteria that are declared very valid, with a percentage of validity of 100%; eight items of assessment criteria were declared valid with a percentage of validity of 75%, and three items of assessment criteria were declared invalid, with a percentage of validity of 50% so that they had to revise correctly and fundamentally about the contents and presentation of the Orchid Diversity pocket book in the Mutis Natural Forest.

Items that are declared very valid, with a validity of 100% are items number 5 and 2. Items that are declared valid, with a percentage of validity of 75% are items number 2, and 3 on the eligibility criteria for presentation, and items numbered 1,3, 4, 5, 6, 7 and 9. Items that are declared very valid indicate that the Orchid Diversity pocket book in the Mutis Natural Forest is very complete according to the structure of the pocket book, and the letters used are very appropriate, while items that are declared valid indicate that the Orchid Diversity pocket book in Hutan Alam Mutis has a logical and coherent presentation, the size of the pocket book is appropriate, the use of appropriate colors, the sentences are read well, the layout on the front (back) cover is in accordance with the size of the letters proportional to the size of the book, and the use of letter variations is not excessive. Items on the validation

instrument that are declared invalid with a validity percentage of 50% are items number 3 and 4 on the presentation eligibility criteria and item number 8 on the graphic eligibility criteria, which indicates that the Orchid Diversity pocket book in Mutis Natural Forest must be revised properly and correctly. in terms of systematic writing, image presentation, and consistency of placement of layout elements.

Based on the data from the validation results by the material expert validator in terms of the feasibility of the book, it does not require a significant revision and the conclusion given by the learning media expert validator (pocket book) is that the Orchid Diversity pocket book in the Mutis Natural Forest is declared worthy to be tested on the fourth semester students of the Study Program Biology Education, University of Timor.

Carry out product trials

After going through the product form development stage, namely the assessment of the initial draft of the Orchid Diversity pocket book in the Mutis Natural Forest, it was validated by material expert validators and learning media expert validators, and based on the conclusions given by the two validators, product trials were carried out to students who had carried out lectures on Higher Plant Botany course. This product trial was carried out in 3 stages, namely individual trials and small group trials. The test results are as follows.

a) Individual trial

Data on the results of student questionnaire assessments on individual trials can be seen in Table 3.

b) Small group trial

Data on the results of student questionnaire assessments in small group trials can be seen in Table 4.

Table 3. Results of Student Questionnaire Assessment on Individual Trials

Names	Score Each Item on the Questionnaire Percentage Validity (%)							
	1	2	3	4	5	6	7	8
Sara Yosina Fallo	75.00	100.00	100.00	100.00	75.00	75.00	75.00	75.00
Meisyantri M. Bahan	75.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00
Doratia Marice Koa	75.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00
Benedikta Balok Bria	75.00	75.00	75.00	100.00	100.00	100.00	100.00	75.00
Lambertini Go'o	75.00	100.00	100.00	100.00	75.00	75.00	75.00	75.00

Table 4. Results of Student Questionnaire Assessment in Small Group Trials

Names	Score Each Item on the Questionnaire Percentage Validity (%)							
	1	2	3	4	5	6	7	8
Priska Corsini Seran	75.00	100.00	50.00	100.00	75.00	75.00	75.00	100.00
Yulita Roswita Neonbeni	75.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00
Meisyantri M. Bahan	75.00	100.00	75.00	100.00	100.00	100.00	100.00	100.00
Dionisius T. Kause	100.00	100.00	75.00	100.00	100.00	75.00	75.00	100.00
Risnayanti	75.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00

Names	Score Each Item on the Questionnaire Percentage Validity (%)							
	1	2	3	4	5	6	7	8
Katarina N. D. Usfal	75.00	100.00	100.00	100.00	75.00	75.00	75.00	100.00
Maria Oktaviana Fallo	75.00	75.00	75.00	50.00	75.00	75.00	75.00	75.00
Fransiska Ermalinda Elu	75.00	75.00	100.00	100.00	75.00	100.00	75.00	75.00
Sisilia Bimese	75.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ardi Faot	75.00	75.00	100.00	100.00	100.00	100.00	100.00	100.00

After obtaining the results of the questionnaire assessment on individual trials and small group trials, further data analysis was carried out on student assessments on individual trials and small group trials, as follows.

Data Analysis of Individual Trial Results

Based on the results of student questionnaire calculations on individual trials contained in Table 3, it is known that in the first item regarding the ease of understanding the subject matter in the Orchid Diversity pocket book in Mutis Natural Forest, 5 students stated Agree (A), so that a validity score of 75 was obtained. %, then for item 2 regarding interest in reading pocket books there are 4 students stating Strongly Agree (SA), so that a validity score of 100% is obtained, while 1 student states Agree (A) with a validity score of 75%.

For item number 3 about the ease of students in understanding the contents of pocket book readings, there are 2 students who stated Strongly Agree (SA), so that a validity score of 100% was obtained, and 3 other people stated Agree (A) with a validity score of 75%. In item number 4 about students who gain broad and deep insight about the types of orchids found in the Mutis Natural Forest, it is known that all students, namely 5 people stated Strongly Agree (SA) so that a validity score of 100% was obtained.

Furthermore, in item number 5 regarding through the use of this pocket book, students gain knowledge about the morphology of orchids, specifically the 10 types of orchids found in the Mutis Natural Forest, there are 3 students who stated Strongly Agree (SA) with a validity score of 100%, while 2 other people agree (A) with a validity score of 75%. Furthermore, item number 6 regarding the material presented in this pocket book provides a real picture to students as well as an example of one of the tall plants found in East Nusa Tenggara Province, especially in North Central Timor Regency, there are 3 students who stated Strongly Agree (SA) with a validity score of 100%, while the other 2 people stated Agree (A) with a validity score of 75%.

Likewise in item number 7 regarding pocket book presentation, where students understand the statements in this book there are 3 students who stated Strongly Agree (SA) with a validity score of 100%, while 2 other people stated Agree (A) with a validity score of 75%. Furthermore, on item number 8, which is about student interest in the pictures contained in this pocket book,

there are 2 students who stated Strongly Agree (SA) with a validity score of 100%, while 3 other people stated Agree (A) with a validity score of 75%.

Based on the student questionnaire calculation data on individual trials, it can be concluded that the Orchid Diversity pocket book in the Mutis Natural Forest did not undergo a significant revision.

Data Analysis of Small Group Trial Results

Based on the results of student questionnaire calculations in small group trials contained in Table 4, it is known that in the first item regarding the ease of understanding the subject matter in the Orchid Diversity pocket book in Mutis Natural Forest, 9 students stated Agree (A), so that a validity score of 75%, while 1 student stated Strongly Agree (SA) with a validity score of 100%. Then for item 2 regarding interest in reading pocket books, 5 students stated Strongly Agree (SA), so that a validity score of 100% was obtained, while 5 other students stated Agree (A) with a validity score of 75%.

For item number 3 about the ease of students in understanding the contents of pocket book readings, there are 5 students who stated Strongly Agree (SA), so that a validity score of 100% was obtained, and 3 other people stated Agree (A) with a validity score of 75%, while 2 other people stated Sufficiently Agree (SfA) with a validity score of 50%. In item number 4 about students who gain broad and deep insight about the types of Orchids found in the Mutis Natural Forest, it is known that 9 people stated Strongly Agree (SA) so that a validity score of 100% was obtained, while only 1 person stated Sufficiently Agree. (SfA) with a validity score of 50%.

Furthermore, in item number 5 regarding through the use of this pocket book, students gain knowledge about the morphology of orchids, specifically the 10 types of orchids found in the Mutis Natural Forest, there are 6 students who stated Strongly Agree (SA) with a validity score of 100%, while 4 other people agree (A) with a validity score of 75%. Likewise, item number 6 regarding the material presented in this pocket book provides a real picture to students as well as an example of one of the tall plants found in East Nusa Tenggara Province, especially in North Central Timor Regency, there are 6 students who stated Strongly Agree (SA). with a validity score of 100%, and 4 other people stated Agree (A) with a validity score of 75%.



Furthermore, in item number 7 regarding pocket book presentation, where students understand the statements in this book there are 5 students who stated Strongly Agree (SA) with a validity score of 100%, and 5 other people stated Agree (A) with a validity score of 75%. Furthermore, on item number 8, which is about student interest in the pictures contained in this pocket book, there are 8 students who stated Strongly Agree (SA) with a validity score of 100%, while 2 other people stated Agree (A) with a validity score of 75%.

Based on the student questionnaire calculation data in the small group trial, it can be concluded that the Orchid Diversity pocket book in the Mutis Natural Forest did not undergo a significant revision.

Implement Product Revision

After the Orchid Diversity pocket book in the Mutis Natural Forest was validated by material expert validators (Orchids) and learning media experts (pocket books) and after going through the product trial phase consisting of individual trials and small group trials, product revisions were then carried out. The revision of the Orchid Diversity pocket book product in the Mutis Natural Forest according to suggestions from material expert validators and learning media experts can be seen in Tables 5 and 6.

Table 5. Revision of Orchid Diversity PocketBook Products in Mutis Natural Forest based on advice from validators of Learning Media Experts (Pocket Books)

Initial draft of validated pocket book	Revised results																																								
<p>DAFTAR ISI</p> <table border="1"> <tr><td>BAB I</td><td>PENDAHULUAN</td><td>1</td></tr> <tr><td>BAB II</td><td>GAMBARAN UMUM KAWASAN HUTAN MUTIS</td><td>3</td></tr> <tr><td>BAB III</td><td>GAMBARAN UMUM ANGGREK</td><td>5</td></tr> <tr><td>BAB IV</td><td>JENIS ANGGREK YANG DITEMUKAN</td><td>11</td></tr> <tr><td>BAB V</td><td>PENUTUP</td><td>22</td></tr> <tr><td>DAFTAR PUSTAKA</td><td></td><td>23</td></tr> </table> <p>bunga, buah dan bijinya.</p> <p>a. Daun</p> <p>Bentuk daun anggrek terdiri dari bermacam-macam bentuk, ada yang bulat telur, bulat telur terbalik, artinya bagian daun yang bagian atas lebar dan bagian pangkal kurang lebar, memanjang bagai pita atau senpa daun tebu. Daun jenis Coelogyne dan Spathoglottis mendekati bentuk daun kunyit, sedangkan daun genus Dendrobium dan Phalaenopsis berbentuk bulat memanjang. (Muthukumar et al., 2011). Tebal daun beragam, dari tipis sampai berdaging dan kaku, permukaannya rata. Daun tidak bertangkai.</p>  <p>Gambar 3.1 Tipe batang anggrek</p>	BAB I	PENDAHULUAN	1	BAB II	GAMBARAN UMUM KAWASAN HUTAN MUTIS	3	BAB III	GAMBARAN UMUM ANGGREK	5	BAB IV	JENIS ANGGREK YANG DITEMUKAN	11	BAB V	PENUTUP	22	DAFTAR PUSTAKA		23	<table border="1"> <tr><td>KATA PENGANTAR</td><td>iv</td></tr> <tr><td>DAFTAR ISI</td><td>v</td></tr> <tr><td>BAB I</td><td>PENDAHULUAN</td><td>1</td></tr> <tr><td>BAB II</td><td>GAMBARAN UMUM KAWASAN HUTAN MUTIS</td><td>3</td></tr> <tr><td>BAB III</td><td>GAMBARAN UMUM ANGGREK</td><td>5</td></tr> <tr><td>BAB IV</td><td>JENIS ANGGREK YANG DITEMUKAN</td><td>11</td></tr> <tr><td>BAB V</td><td>PENUTUP</td><td>22</td></tr> <tr><td>DAFTAR PUSTAKA</td><td></td><td>23</td></tr> </table> <p>a. Akar</p> <p>Akar anggrek berbentuk silindris, berdaging, lunak dan mudah patah. Bagian ujung akar meruncing, licin dan sedikit lengket. Dalam keadaan kering, akar tampak berwarna putih keperak-perakan dan hanya bagian ujung akar saja berwarna hijau atau tampak agak keunguan. Akar yang sudah tua akan berwarna coklat tua dan kering. Akar anggrek berfilamen, yaitu lapisan luar yang terdiri dari beberapa lapis sel berongga dan transparan, serta merupakan lapisan pelindung pada sistem saluran akar (Muthukumar et al., 2011).</p> <p>Anggrek tipe monopodial mempunyai batang utama dengan pertumbuhan tidak terbatas. Bentuk batangnya ramping tidak berumbi. Tangkai bunga keluar di antara dua ketiak daun, contohnya genus Vanda, Aranthera dan Phalaenopsis.</p>  <p>a. Tipe simpodial b. Tipe monopodial</p> <p>Gambar 3.1 Tipe batang anggrek</p>	KATA PENGANTAR	iv	DAFTAR ISI	v	BAB I	PENDAHULUAN	1	BAB II	GAMBARAN UMUM KAWASAN HUTAN MUTIS	3	BAB III	GAMBARAN UMUM ANGGREK	5	BAB IV	JENIS ANGGREK YANG DITEMUKAN	11	BAB V	PENUTUP	22	DAFTAR PUSTAKA		23
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<p>Comment [B1]: Perbaiki Ahli Media Pembelajaran, sebaiknya ditulis nama kawasannya</p> <p>Comment [B2]: Perbaiki Ahli Media Pembelajaran: Tolong dilihat penulisan nama Anggreknya</p>																																									
<p>Comment [B1]: Perbaiki dari ahli media: Morfologi Anggrek: a. Akar b. Batang c. Daun d. Dst</p>																																									
<p>Comment [B2]: Perbaiki Ahli Media: Penomoran Gambar harus konsisten</p>																																									

Initial draft of validated pocket book	Revised results
<p>...sebagai seluruh biji, serta karena ukurannya sangat kecil sehingga menyerupai butiran debu. Struktur biji anggrek hanya terdiri dari 4-200 sel saja sehingga kapasitasnya untuk membawa cadangan makanan menjadi sangat terbatas.</p> <p>Menurut Udomdee et al. (2014), kematangan buah anggrek sangat tergantung pada jenis anggrek itu sendiri. Buah anggrek Dendrobium akan matang dalam umur 3-4 bulan, buah anggrek Vanda setelah 6-7 bulan, sedangkan buah anggrek Cattleya baru matang setelah 9 bulan. Buah</p>	<p>Biji anggrek sangat kecil, biasanya dengan panjang 1-2 mm dan lebar 0,5-1 mm. Biasanya per polong atau buah terdapat 1.300-4.000.000 biji anggrek. Biji anggrek terdiri dari testa atau kulit biji yang tebal dan embrio yang terdiri dari sekitar 100 sel (Swany et al., 2004). Biji anggrek dikenal dengan sebutan 'dust seed' karena ukurannya sangat kecil sehingga menyerupai butiran debu. Struktur biji anggrek hanya terdiri dari 4-200 sel saja sehingga kapasitasnya untuk membawa cadangan makanan menjadi sangat terbatas.</p> <p>Menurut Udomdee et al. (2014), kematangan buah anggrek sangat tergantung pada jenis anggrek itu sendiri. Buah anggrek Dendrobium akan matang dalam umur 3-4 bulan, buah anggrek Vanda setelah 6-7 bulan, sedangkan buah anggrek Cattleya baru matang setelah 9 bulan. Buah anggrek adalah buah lentera dan akan pecah ketika matang. Pengambilan buah lebih baik dilakukan sebelum buah pecah tetapi sudah mendekati masa matang sehingga biji siap untuk berkecambah.</p>
<p>HUTAN DESA SAENAM</p> <p>Kekayaan Jenis Anggrek (Orchidaceae)</p> <p>Berdasarkan hasil eksplorasi jenis anggrek di Hutan Lindung Desa Saenam, terdapat 9 jenis anggrek yang sebagian besar termasuk anggrek epifit. Adapun rinciannya dapat dilihat pada Tabel 3 di bawah ini.</p>	<p>4.1. Kekayaan Jenis Anggrek (Orchidaceae)</p> <p>Berdasarkan hasil eksplorasi jenis anggrek di Hutan Lindung Desa Saenam, terdapat 9 jenis anggrek yang sebagian besar termasuk anggrek epifit. Adapun rinciannya dapat dilihat pada Tabel 3 di bawah ini.</p>
<p>Berdasarkan hasil identifikasi bahwa ditemukan 8 genus anggrek epifit yaitu Pholidata, Dendrobium, Aerides, Platysteles, Papilionanthe, Phretia, Cattleya, dan Vanda yang hidup tersebar di sekitar Hutan Lindung Desa Saenam. Jenis inang yang ditemukan ada dua, yaitu Pinus (<i>Pinus sp.</i>) dan Jambu Biji Hutan (<i>Psidium guajava</i>).</p> <p>DESKRIPSI JENIS ANGGREK</p> <p>Hutan Mutis</p> <p>DAFTAR PUSTAKA</p> <p>Adams, P. B. 1988. Reproductive Biology of Species Orchids : Principles and Practice. Australia : The Orchid Species Society of Victoria Inc. and the School of Botany.</p> <p>Bhojwani, S. S and Bhatnagar, S. P. 1999. The Embryology of Angiosperm. Fourth Revised Edition. Delhi : Vikas Publishing House. PVT. LTD.</p>	<p>4.2. DESKRIPSI JENIS ANGGREK</p> <p><i>Aerides vandarum</i></p> <p>Habitat: epifit. Tidak berumbi, tingginya 1,5-40 cm. Daun: teret, batang pajang seperti batang dendrobium. Perbungaan: muncul dari depan umbi semu dan daun yang belum berkembang. Persebaran: tersebar luas di NTT, Jawa, Kalimantan, Sumatera dan Semenanjung Malaysia.</p> <p>DAFTAR PUSTAKA</p> <p>Adams, P. B. 1988. Reproductive Biology of Species Orchids : Principles and Practice. Australia : The Orchid Species Society of Victoria Inc. and the School of Botany.</p> <p>Bhojwani, S. S and Bhatnagar, S. P. 1999. The Embryology of Angiosperm. Fourth Revised Edition. Delhi : Vikas Publishing House. PVT. LTD.</p>



Comment [B1]: Ahli materi: morfologi didahulukan baru fisiologinya

Comment [B6]: Perbaiki dari ahli media: perlu konsisten dalam pemberian nomenklatur

Comment [B1]: Perbaiki Ahli Media; Pada Deskripsi Jenis Anggrek, kata Hutan Lindung tidak perlu lagi!

Comment [B2]: Perbaiki Ahli Media; Alangkah baiknya penulisan Daftar Pustaka seperti pada umumnya

Table 6. Revision of Orchid Diversity Pocket Book Products in Mutis Natural Forest based on suggestions from Material Expert validators (Orchids)

Initial draft of validated pocket book	Revised results
<p>...kecak daun, contohnya genus vanda, Aranthera dan Phalaenopsis.</p>  <p>a. Tipe simpodial b. Tipe monopodial</p> <p>Gambar 3.1 Tipe batang anggrek</p> <p>Comment [B1]: Gambar 3.1. tidak begitu jelas tipe perbatangannya</p>	<p>Anggrek tipe monopodial mempunyai batang utama dengan pertumbuhan tidak terbatas. Bentuk batangnya ramping tidak berumbi. Tangkai bunga keluar di antara dua ketiak daun, contohnya genus Vanda, Aranthera dan Phalaenopsis.</p>  <p>a. Tipe simpodial b. Tipe monopodial</p> <p>Gambar 3.1 Tipe batang anggrek</p>

Initial draft of validated pocket book

Revised results

Dendrobium smiliea

Habitat: epifit. Umbi semu: membulat, berlingiran ketika tua, terbentuk dari beberapa ruas ± 14, tersusun rapat pada rimpang. Batang: tumbuh di ujung umbi semu, panjang sampai 20-30 cm. Daun: tersusun pada batang. Perbungaan: majemuk seperti sikat, tumbuh dari batang yang tidak berdaun, jumlah bunga 8-30 kuntum. Bunga: merah muda, labellum berwarna hijau. Persebaran: tersebar luas di Sumatera, Myanmar, Thailand, Semenanjung Malaysia, Jawa, dan Filipina.

Klasifikasi Dendrobium smillieae

Kingdom : Plantae

Divisi : Tracheophyta
 Kelas : Liliopsida
 Ordo : Asparagales
 Famili : Vandaaceae
 Genus : Dendrobium
 Spesies : Dendrobium smillieae
 Sehingga menyerupai butiran debu. Struktur biji anggrek hanya terdiri dari 4-200 sel saja sehingga kapasitasnya untuk membawa cadangan makanan menjadi sangat terbatas.

Menurut Udomdee et al. (2014), kematangan buah anggrek sangat tergantung pada jenis anggrek itu sendiri. Buah anggrek Dendrobium akan matang dalam umur 3-4 bulan, buah anggrek Vanda setelah 6-7 bulan, sedangkan buah anggrek Cattleya baru matang setelah 9 bulan. Buah

Comment [B2]: Perbaiki Ahli Materi: Penulisan nama latin seharusnya dicetak miring

Comment [B1]: Ahli materi: morfologi didahulukan baru fisiologinya

Dendrobium smiliea

Habitat: epifit. Umbi semu: membulat, berlingiran ketika tua, terbentuk dari beberapa ruas ± 14, tersusun rapat pada rimpang. Batang: tumbuh di ujung umbi semu, panjang sampai 20-30 cm. Daun: tersusun pada batang. Perbungaan: majemuk seperti sikat, tumbuh dari batang yang tidak berdaun, jumlah bunga 8-30 kuntum. Bunga: merah muda, labellum berwarna hijau. Persebaran: tersebar luas di Sumatera, Myanmar, Thailand, Semenanjung Malaysia, Jawa, dan Filipina.

Klasifikasi Dendrobium smillieae

Kingdom : Plantae

Divisio : Angiospermae

Kelas : Liliopsida

Ordo : Asparagales

Biji anggrek sangat kecil, biasanya dengan panjang 1-2 mm dan lebar 0,5-1 mm. Biasanya per polong atau buah terdapat 1.300-4.000.000 biji anggrek. Biji anggrek terdiri dari testa atau kulit biji yang tebal dan embrio yang terdiri dari sekitar 100 sel (Swany et al., 2004). Biji anggrek dikenal dengan sebutan 'dust seed' karena ukurannya sangat kecil sehingga menyerupai butiran debu. Struktur biji anggrek hanya terdiri dari 4-200 sel saja sehingga kapasitasnya untuk membawa cadangan makanan menjadi sangat terbatas.

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Conclusion

The conclusion of this research is that the development of the Orchid Diversity pocket book in the Mutis Natural Forest has gone through 5 stages according to the Borg and Gall development model, namely the stage of conducting preliminary research, planning, developing product forms, conducting product trials, and revising products, so that the resulting a pocket book on Orchid Diversity in the Mutis Natural Forest which can be used as a learning resource for students of the Biology Education Study Program, University of Timor, especially in the Higher Plant Botany course.

Acknowledgments

We thank the Head of Saenam Village who has allowed us to conduct research in Saenam Village, along with several local community students who took part in data collection in the field as well as the willingness of younger students to be the subject of a trial of this pocket book product.

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