

Development of a Literacy-Based Orchid Diversity Book as a Learning Resource

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Abstrak

Studi ini mengkaji analisis hasil buku teks tambahan. Untuk menilai kelayakan buku teks suplemen berbasis literasi, Untuk menentukan bagaimana buku suplemen berbasis literasi mempengaruhi pembelajaran siswa. Studi ini menggunakan paradigma pengembangan Thiagarajan 4-D. Mahasiswa sarjana biologi mengambil Taksonomi Spermatofit. Buku teks suplemen yang digunakan oleh mahasiswa Program Studi Biologi/Keguruan Biologi Unimed memperoleh skor 87% dalam kelompok kecil dan 89% dalam kelompok besar, yang menunjukkan kriteria sangat baik dan layak. Validasi ahli terhadap elemen pengajaran buku suplemen tentang keanekaragaman anggrek (Orchidaceae) dengan menggunakan literasi sains sebagai sumber belajar menghasilkan 80% standar baik atau layak. Skor pandangan sejawat rata-rata untuk materi literasi sains adalah 81% dengan kriteria sangat baik. Validasi oleh spesialis pembelajaran terhadap buku suplemen keanekaragaman anggrek (Orchidaceae) berdasarkan literasi sains sebagai sumber belajar menghasilkan 87,9% sangat baik atau sangat layak. Validasi ahli terhadap desain tata letak buku sumber belajar berbasis literasi tentang keanekaragaman anggrek (Orchidaceae) memperoleh 85,5% dengan kategori sangat baik. Nilai p uji-t (sig. dua sisi) = $0,000 < 0,05$, menunjukkan perbedaan yang signifikan antara tes awal dan akhir setelah perlakuan.

Kata Kunci; Pengembangan, Keanekaragaman Anggrek, Literasi.

Abstract

This study examines the analysis of supplementary textbook results. To assess the feasibility of literacy-based supplementary textbooks, To determine how literacy-based supplementary textbooks affect student learning. This study uses the Thiagarajan 4-D development paradigm. Biology undergraduate students took Spermatophyte Taxonomy. The supplementary textbook used by students of the Biology/Biology Teaching Program at Unimed obtained a score of 87% in small groups and 89% in large groups, which indicates very good and feasible criteria. Expert validation of the teaching elements of the supplementary textbook on orchid diversity (Orchidaceae) using scientific literacy as a learning resource resulted in 80% good or feasible standards. The average peer review score for scientific literacy materials was 81% with very good criteria. Validation by learning specialists of the supplementary textbook on orchid diversity (Orchidaceae) based on scientific literacy as a learning resource resulted in 87.9% very good or very feasible. Expert validation of the layout design of the literacy-based learning resource book on orchid diversity (Orchidaceae) obtained 85.5% with a very good category. The p -value of the t-test (two-tailed sig.) = $0.000 < 0.05$, indicating a significant difference between the initial and final tests after treatment.

Keywords: Development, Orchid Diversity, Literacy.

1. INTRODUCTION

Spermatophyte taxonomy provides several learning opportunities. Orchids are rarely used as learning resources in "Angiospermae: Monocotyledons". Many daily routines involve this principle. Students sometimes struggle to grasp things. Chapter 6's requirements analysis with 30 Medan State University Biology and Biology Education students showed the value of "Angiospermae: Monocotyledons" content. The requirements analysis showed that 60% of respondents found orchid variety books important to study, while 40% deemed them extremely required because the information had many benefits.

Students use learning resources to gain knowledge, experience, and skills (Sudjarwo, 1989). Learning resources might be data, people, or other forms with messages. According to Mulyasa (2004), educational books, journals, modules, encyclopedias, transparencies, films, and videos are designed to aid learning. Undergraduate students in Biology and Biology Education, Faculty of Mathematics and Natural Sciences, Medan State University, must understand orchid morphology, habitat, and cultivation to analyze and recognize their functions in the Spermatophyte Taxonomy course. Undergraduate students in KKNI level 6 must apply their specialization and use science and technology in their field to solve problems and adapt to current situations.

A Medan State University sixth-semester biology student analysis found that additional books have never been employed for learning activities, especially in Spermatophyte Taxonomy. Thus, students do not use orchid diversity books in lectures. Based on learning process interviews, surveyed students said the Spermatophyte Taxonomy course needed a textbook or reference for orchid themes. After analyzing the demands of Spermatophyte Taxonomy students, 60% approved and 30% highly approved of its development as a supplementary orchid reference book. Abdillah (2020) states that some orchid and supplemental textbook studies have shown that modified and adapted textbooks can be used as teaching tools. Among the study's criteria were 72.18 percent expert judgment on the media, substance, and issues (very changeable). Individual trials were 100% valid, small group trials 100%, and large group trials 99.1%. Since 66.66% of students met the Minimum Completion (KKM), supplemental texts are accessible.

Supplementary textbooks increased learning outcomes and scientific attitudes, with an average N score of 0.75 in the experimental class and 0.62 in the control class, according to Kurniawan (2020). Scientific attitudes rose 0.32 in the experimental and 0.23 in the control classes. Therefore, more textbooks are best. Arif's 2020 research found that additional textbooks should be valid and useful to boost students' abilities and knowledge. This study used validation sheets and questionnaires for practicality and validity. A small-scale experiment produced a practical supplementary textbook with 100 student and instructor questionnaire scores. Validity and practicality showed the extra textbook was effective. The additional textbook trial boosted students' medium and low knowledge and positive attitudes in high, medium, and low categories, according to Musmiah (2019). The extra textbook increased students' knowledge and attitudes, depending on implementation. Students liked the extra textbook. Puranata (2005) estimates 5,000 orchid species in Indonesia, predominantly from Sumatra to Papua. Kalimantan, Papua, Sumatra, and Maluku have 3,000, 1,000, 990, and 125 orchid species. Java has 731 species, 231 endemic (Comber, 1990).

Indonesian orchid varieties are better known internationally than domestically. This is because orchids are less well-known. Therefore, students must recognize and explore their potential. High diversity allows students to learn about the properties and potential of orchids. Orchid varieties can

help children learn independently (Any, 2011). Based on the above description, research is needed on the Development of a Literacy-Based Orchid Diversity Book as a Learning Resource.

2. RESEARCH METHODS

The Biology Department, Faculty of Mathematics and Natural Sciences, Medan State University, Jalan William Iskandar Pasar V, Zip Code 20221, did this research. The orchid (Orchidaceae) research will take place in Medan City (Kebun Anggrek; Jln. Pelajar No. 171 Medan Denai) from January to March. Undergraduate biology students taking Spermatophyte Taxonomy and three expert validators in knowledge, materials, learning, and packaging design participated in this study. Ten sixth-semester biology students were examined in small groups, while 30 were assessed in a big group. R&D is utilized to manufacture and distribute a product. Thiagarajan's 4-D development model is used (Sugiono, 2015). This study used total sampling, where the sample size equals the population (Sugiono, 2009).

3. RESULTS AND DISCUSSION

The development of a companion book on orchid diversity (Orchidaceae) as a learning resource was carried out in several stages, in accordance with the Thiagarajan development model (or 4D model). The stages of the Thiagarajan model (or 4D model) consist of definition (Define), design (Design), development (Development), and dissemination (Diffusion). The results of the process of developing a companion book on orchid diversity (Orchidaceae) as a learning resource, using the Thiagarajan model, are explained below.

Define

The major issue inspired a literacy-based orchid diversity supplementary textbook as a learning resource. Student textbooks for Spermatophyte Taxonomy still include Angiospermae: Monocotyledon, which addresses selected monocot groups. The orchid (Orchidaceae) debate does not include species and cultivation methods. Thus, a literacy-based textbook on orchid diversity is needed to help students comprehend the benefits of orchids and identify and grow their local orchids. After finding the problem, analyze pupil needs to learn about orchids using literacy-based reading materials. This study included 30 Medan State University Biology Department students who took Spermatophyta Taxonomy. According to the needs analysis, 46.9% of students only used one learning resource for the Spermatophyta Taxonomy course, 56.3% said the book was incomplete and needed improvement, 65.2% said the supplement book was very important, and 62.5% said they needed a scientifically based orchid diversity supplement book.

Design

The initial design stage begins with product creation. Currently, the book is made for quality. Develop companion books for non-textbook books. School and general education institutions can use companion books, although they are not essential learning resources. Companion books supplement textbooks or provide detailed scientific and technology knowledge and assistance; (3) Supplements will not be given sequentially by educational level; (4) Readers of all levels or classes can use additional resources or content; Because of their free, creative, and inventive design, supplement books are not restricted by scientific education requirements or learning processes and systems. After identifying scientific literacy supplement book characteristics, a book framework is created: book cover, book identity, prologue, Sekapur Sirih, and table of contents. Figure list; Introduction, Introduction to Orchids, Orchid Diversity, Bibliography, Glossary, Index, and Author Biography. This program encourages students to study orchids (Orchidaceae) to assist them grow them and solve the problem of students' ignorance of these high-value plants. Designing the instrument follows determining the product kind and layout. This instrument design includes an expert validator's product feasibility assessment, student responses, and multiple-choice questions to

assess effectiveness. An expert validator with a master's degree and five years of experience validates the instrument. After review, the expert validator finds the instrument adequate. The learning module display is below



Figure 1 .Teaching Module Display

Development

Experts in content, layout, and instruction will evaluate the draft book and student responses to it. After review and revision, an extract of the draft book can be found in the table below. The expert team's reviews and scores obtained during the validation process, as well as student responses to the product, will be presented in the following subsection.

The validation by material experts was conducted by Prof. Dr. Ashar Hasairin, M.Sc., Professor of Lower Plant Structure and Development, Medan State University. This validation was conducted to improve the quality of the book's materials. Aspects assessed by the experts were the suitability, accuracy, and reliability of the materials, the systematic nature of the learning process, the effectiveness of supplementary books, language, and various aspects of scientific literacy. The results of the material expert team's average percentage for each component can be seen in Table 1.

Table 1. Percentage of Material Feasibility Assessment by Material Experts

No.	Evaluation Components	Average percentage (%)	Criteria
1.	Suitability of materials	75	Good
2.	Precision and strength of materials	71	Good
3.	Learning systematics	76	Good
4.	Effectiveness of supplementary textbooks in learning	89	Very good
5.	Language	90	Very good
	Average	80	Good

Subject matter experts validate content suitability (suitability, accuracy, reliability, systematic learning, companion book efficiency, and language). Each component has multiple features, therefore the companion book is 80% validated and passes quality standards. The literacy-based validation rate is 81%, indicating quality. As a learning resource, the literacy-based companion book on orchid diversity (Orchidaceae) is suitable for student reading.

Results of the distribution phase

The Medan State University Department of Biology Education issued this additional textbook to Spermatophyte Taxonomy students. This distribution assessed how well extra literature helped students learn about orchids. The book was delivered to 30 control and experimental students before and after testing. The experimental class took pre- and post-tests before and after reading "Literacy-Based Orchid Diversity" and the validated book, while the control class did not. The validator verified 30 multiple-choice questions on the pre- and post-tests. N-gain test findings were based on control class pre- and post-tests. The N-gain test was 0.04 (4%) and unsuccessful. Experimental class N-gain was 0.63 (63%) and moderate (extremely effective). The N-gain exam shows that Orchid Diversity Literacy improves pupils' cognition. In the t-test, the p-value (Sig. 2-tailed) = 0.000 < 0.05 indicates a significant difference between the initial and final tests following treatment. The huge difference (t-value = -21.906) suggests that the treatment has a big impact. The average difference (-45.44) shows that the average post-test score is 45 points higher than the pre-test score, a considerable improvement. This increase is consistent across samples, as shown by the confidence interval (-49.69 to -41.20). According to the t-test, the treatment is quite effective because the average increase is 45.44. Given the p-value (0.000) < 0.05, the null hypothesis (no difference) is rejected, indicating a substantial impact of treatment on post-test findings. Sig.2-Tailed p-value is 0.00, less than 0.05. This study shows a significant difference and strongly encourages students to use literacy-based orchid diversity books (Orchidaceae) to develop their cognitive capacities.

DISCUSSION

The Taxonomy of Spermatophytes course's Angiospermae: Monocotyledon subchapter covers orchids (Orchidaceae). Researchers found little orchid information in student guidebooks. Along with orchid book availability observations, researchers did a 20-item Likert scale student needs analysis of 30 Medan State University biology education students. Data showed that 68% of pupils needed more orchid books for information. The Taxonomy of Spermatophytes student guides fails to achieve the RPS's learning objectives of analyzing orchids' role and recognizing them through an introduction to orchid anatomy, habitat, and culture. Researchers created a student textbook since orchid textbooks usually cover Angiospermae: Monocotyledon, which does not address this learning purpose. The Spermatophyte Taxonomy course can use the literacy-based orchid diversity companion book. This book was adapted from orchid observations for scientific literacy. At the orchidarium, Dendrobium, Luna (Phalaenopsis), Cattleya, and terrestrial orchids were sampled. To distinguish orchids, roots to flowers were photographed and observed.

Orchidism supports Spermatophyte Taxonomy. Students need more literacy-based orchid learning resources to understand and apply scientific concepts and perspectives, according to a requirements analysis. This literacy-based book is aimed to engage pupils as a reference. This book's research inspires students' ideas, conceptions, and creativity. Research-based goods can be used in teaching (Amin, 2010). The quick and complex innovations of today require teachers and students to read and analyze a variety of relevant sources. Orchid analysis is only partially covered in the textbook "Spermatophyte Taxonomy" used

by most students. Quality textbooks should offer content that allows teachers to answer students' questions and achieve their goals (Ministry of National Education, 2008).

The accompanying textbook covers orchid cultivation, from media to methods. Research outcomes are photographed in this book. According to the research, the extra textbook's visuals can engage pupils and inspire them to learn. (a) The material must be related to the skills being acquired; (b) It must be based on the topic; (c) It must be logical, systematic, communicative, and interactive; (d) Consider student conditions and characteristics; and (e) Use engaging technology and presentation methods. An easy-to-read book uses good language. Based on the author's views, it is shown and explained (Ministry of National Education, 2008). Developed goods include: The book's content is reflected in the author's observations in the Orchid Diversity section. Research results, plant traits, and benefits are photographed; (4) Bibliography, glossary, and index. Environmental problem-solving can create memorable learning experiences (Pratama, 2016). Scientific literacy-based teaching tools can help students think scientifically, logically, and critically about their problems and identify answers. Scientists explain scientific phenomena, analyze and design scientific research, produce scientific data, and give proof (Simatupang, 2017).

4. CONCLUSION

The additional textbook used by Unimed Biology/Biology Teaching Program students scored 87% in a small group and 89% in a large group, showing outstanding and highly suitable standards. Validation assessed the literacy-based orchid diversity (Orchidaceae) supplementary textbook's learning potential. Expert validation of the supplementary textbook on scientific literacy (Orchidaceae) as a learning resource scored 80%, indicating good or suitable. Scientific literacy peer review averaged 81%, indicating acceptable quality. The supplementary textbook on scientific literacy (Orchidaceae) was validated by learning specialists and scored 87.9%, indicating very good or very adequate. Expert validation of the literacy-based orchid diversity (Orchidaceae) textbook layout design as a learning resource scored 85.5%, which is very good. With a p-value of $0.000 < 0.05$, the t-test shows a significant difference between pre-test and post-test after therapy. The t-value = -21.906 shows a substantial difference, indicating a robust treatment impact. The mean difference (-45.44) shows that the average post-test score is significantly higher than the average pre-test score by 45 points. The confidence interval (-49.69 to -41.20) shows a continuous sample rise.

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