

Development of Ethnopedagogy-Based Reference Books on Mendut Temple Reliefs Vertebrate Sub-Materials

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Abstract

This research aims to produce a product in the form of a reference book on the identification of fauna reliefs and analyze the feasibility of the book based on material and media aspects as well as knowing the responses of biology teachers and students as users in the classroom. Mendut Temple as one of the historical heritages of Buddhist temple is located in Mendut Village, Mungkid District, Magelang Regency. In addition to its beautiful and sturdy visuals, Mendut Temple holds many moral messages through fable stories carved on the temple walls, namely Pancatantra and Boddhisattva Reliefs. From the reliefs, Mendut Temple has great potential as a learning resource in the form of a reference book. This research is designed as Research and Development (R&D) research with the ADDIE development model, this model includes Analysis, Design, Development, Implementation, and Evaluation. This research is limited to the development stage. Data collection was carried out by observing the fauna found in the reliefs of Mendut Temple. Analyzing the feasibility of the book using a modification of Sugiyono, namely through a validation sheet for the feasibility of the book adapted by BSNP. The results of the study found as many as 3 classes of vertebrate animals including Aves with 7 orders, Reptiles with 3 orders, and Mammals with 6 orders. The material expert validator's assessment of the developed reference book was 97.82%, for media experts it was 98%. The biology teacher's response to the reference book was 96.25% and the student response was 88.09%. This shows that the reference book developed is very feasible to get used

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Introduction

Mendut Temple, one of the historical heritages of Buddhist temples, is located in Mendut Village, Mungkid District, Magelang Regency, Central Java Province. The Syailendra dynasty built Buddhist temples as a means of worship for Buddhists, including Kalasan, Borobudur, Mendut, and Pawon (Sunaryo, 2009). Behind its solid visuals, Mendut Temple holds many moral stories through its reliefs, namely the Pancatantra and Bodhisattva Reliefs. The attraction of these reliefs is that all stories are depicted with animal characters, namely fable stories (Borobudur Conservation Center, 2016). The potential of Mendut Temple as one of the local wisdom has principles and ways that are embraced, understood, and applied by local communities in interacting with their environment and are transformed in the form of value systems and customary norms (Zulkarnain & Febriansyah, 2008).

The educational process makes local wisdom essential to be realized because local wisdom needs to be addressed. One of the efforts to instill the value of local wisdom in today's society is through the education process. The educational process in question can be through Ethno pedagogy-based learning.

Ethno pedagogy views local knowledge and local wisdom as a source of innovation and skills that can be empowered for the welfare of society (Heriawan & Hidayati, 2018).

Based on the needs analysis conducted at SMA N 3 Magelang on October 31, 2022, regardless of the learning model applied, the learning process will not feel complete if there is no media as an accompaniment that has an essential role in learning. From the results of observations and interviews with one of the Biology teachers at SMA N 3 Magelang, there is no application of ethno-pedagogical learning in biology learning both from learning models and learning resources. The limited learning resources used at this time are a problem that schools must face. The Merdeka Curriculum student handbook has yet to be widely distributed. The learning resources used by students in learning biology, especially in the material of Animalia submateri vertebrata, are only textbooks published by the Ministry of Education and Culture Curriculum 2013 and LKS companion for students; local wisdom-based learning resources have yet to be found. Therefore, students need innovations from previous learning sources, namely reference books.

A reference book is a book that consists of content and presentation that can be used to obtain information about science, technology, art, and culture in a deep and broad scope (KBBI, 2016). Based on these problems, the idea of compiling a student companion book in the form of a fauna reference book as a result of fauna identification on *Pancatantra* and *Bodhisattva* reliefs as a supporting learning resource for vertebrate sub-materials, which is devoted to learning outcomes (CP) describing and simulating simply the benefits for humans, animal and plant breeding and stages of human development, energy, natural resources, and their utilization in everyday life, this can be an effort to raise the local wisdom of Mendut Temple as one of the world's historical heritages. Based on the existing problems, development research was conducted in the form of a reference book on the identification of *Pancatantra* and *Bodhisattva* fauna reliefs at Mendut Temple Magelang, with the aim of (1) knowing the fauna profile identified in the reliefs, (2) knowing the feasibility of reference books as learning resources based on material and media aspects (3) knowing the responses of biology teachers and students to the book.

Methods

The method used in this research is Research and Development (R&D) using the ADDIE model. This model includes (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation (Dick & Carey, 1996). In the analysis stage, four stages were carried out: needs analysis, curriculum analysis, analysis of learner characteristics, and material analysis (observation and identification of fauna reliefs). At the design stage, what is done is determining the book's framework and preparing the reference book. The development stage is achieved by realizing the product, assessing the reference book based on material and media aspects, and taking response data from prospective users, namely biology teachers and students. The fourth stage, namely the implementation of reference books, still needs to be done because this research focuses on developing reference books as reference books. The last stage is the evaluation carried out at each stage passed.

The data collection technique was carried out in several stages, including observation, literature study, identifying reliefs, validity testing, and questionnaire responses. In the material aspect, there are four indicators, including (1) material updates, (2) material accuracy, (3) data presentation techniques, (4) language. In the media aspect, there are also four indicators, including (1) Reference Book Size, (2) Reference Book Cover Design, (3) Reference Book Content Design and (4) Language. The results will be interpreted using a rating scale according to Arikunto (2010).

In collecting data on responses by teachers and students, a questionnaire with a total of seven indicators includes (1) Graphic Aspect, (2) Effectiveness of Reference Book, (3) Material Aspect, and (4) Language. In student responses, there are three indicators, namely (1) Learner Interest, (2) Reference Book Material, and (3) Language. The assessment obtained will be analyzed using a rating scale table according to Widoyoko (2012).

Results and Discussion

Needs Analysis

At the needs analysis stage, it was found that the learning resources used in learning biology in this material were still limited to using LKS and the 2013 Curriculum package book published by the Ministry of Education and Culture. Limited learning resources are owned by students, making students only focus and making LKS the primary learning resource. The companion worksheets are centered on material or theory, practice questions, and some practicum assignments. The lack of innovation in biology learning both in the classroom and in learning resources makes students guided that biology is only limited to environmental theory, which causes students to explore less and hone their creativity.

Curriculum Analysis

The curriculum used by class X students of SMA N 3 Magelang is the Merdeka curriculum. The implementation of the Merdeka curriculum is quite good, seeing the project of strengthening the profile of P5 Pancasila students. Another form of implementation of the Merdeka curriculum in biology learning is to use teaching modules compiled by biology teachers and PLP students of Tidar University on the material Classification of living things. The teaching modules contain teaching materials, student worksheets (LKPD), assessment rubrics, and teacher and student reflection forms. The learning methods use a scientific and environmental approach, with a problem-based learning model and learning methods through observation, practicum, lecture, and discussion.

Analysis of student characteristics

Based on the observation of students in class X SMA N 3 Magelang, some students show their activity in the classroom, but only a few students pay less attention. They tend to pay attention if presented with something different or new. This is evidenced by students' enthusiasm when participating in the second half of P5 activities at Mount Tidar Magelang. Then, many students showed that they prefer certain things that can be found around them, such as practicum that utilizes the environment around the school.

Material Analysis

The Animalia material used is based on the high school Merdeka Curriculum of biology class X devoted to the CP above. At this stage, a story analysis was also carried out on the reliefs from March 13 to May 5, 2023. This aims to adjust the identified fauna with the story characters and find out what subphylum is carved on the reliefs, then validated by field supervisors from the Museum and Cultural Heritage Unit Mendut, Pawon, and Borobudur. The sub-phylum found on the reliefs include 15 Aves, 14 Mammals, and three reptiles.

Design

At the design stage, there are several stages: (1) Determining the framework of the reference book, (2) Compilation of reference books. The draft design display on the book cover can be seen in [Figure 1](#).



Figure 1. Cover design

Development

After observation research, a literature study from March 13, 2023 to May 5, 2023 obtained vertebrate fauna data with three classes: Aves, Reptiles, and Mammals. The identified fauna reliefs were then developed in the form of reference books that were tested for feasibility as reference books based on material and media aspects. The results of the feasibility test of reference books based on material aspects can be seen in [Table 1](#).

Table 1. Results of Material Expert Validation

No	Evaluation Score	Skor
1	Update of the material	96,42%
2	The accuracy of the material	100%
3	Book Presentation Techniques	95%
4	Language	100%
Percentage		97,82%
		(Very Feasible)

The reference book is also developed by presenting facts or realities equipped with pictures, diagrams, and illustrations that are as efficient as possible to increase students' understanding in observing an object that is adjusted to the learning outcomes (CP) of phase E high school biology, namely describing and simulating in a simple way the benefits of animals and plants and the stages of human development, energy, natural resources, and their use in everyday life. Using reference books can provide benefits and minimize cost and time expenditures in learning biology (Gita & Nanna, 2018).

The accuracy in the presentation of data, facts, terms, images, and literature references is adjusted to the existing writing regulations based on the Perfected Spelling (EYD) edition to replace the General Guidelines for Indonesian Spelling (PUEBI) in 2022. The description of the material presented in the book, especially on moral messages and the location of fauna reliefs at Mendut Temple, is presented in a fun fact box with the addition of relief images, which in taking documentation, are edited by providing HDR effects to make it easier for readers to see the shape of the reliefs can be conveyed well to readers. The cultural values listed can be applied in everyday life, namely in developing commendable habits and behaviors aligned with universal values, religious, and national cultural traditions by the objectives of cultural education and national character (Setiawan & Sulistani, 2019). The results of the media aspect validity test can be seen in Table 2.

Table 2. Results of Media Expert Validity

No	Evaluation Score	Skor
1	Reference book size	96,42%
2	Cover design	100%
3	Reference book Content design	95%
4	Language	100%
Percentage		98%
		Very Feasible

The four components tested refer to the assessment based on the National Education Standards Agency (BSNP, 2014). The size of the reference book chosen is A5, which is 14.8 cm x 21 cm. This size was chosen so that it is easy to carry anywhere and does not take up much space in storage (Sandy et al., 2018). The cover design in the reference book was developed with matching color tones, namely cream and green, in the design process using the Corel application. This reference book was developed using Cambria font size 11, with consistent use of punctuation, icons, pages, and terms so that this book is easy to read. The use of clear photos or illustrations can reduce the occurrence of misconceptions. The quality of images presented clearly can minimize misconceptions (Suparno, 2013).

The next stage is the implementation of the reference book which is limited only to the collection of response data conducted by biology teachers and 36 students of SMA N 3 Magelang class. The response test results of biology teachers and students can be seen in Table 3 and Table 4.

Table 3. Biology Teacher Response Test Results

No	Evaluation Score	Skor
1	Graphic Aspects	95%
2	Effectiveness of Reference Book	95%
3	Material Aspect	100%
4	Language	95%
Percentage		96,25%
		Very Feasible

Table 4. Student Response Test Results

No	Evaluation Score	Skor
1	Student interest in reference books	91,08%
2	Reference Book Material	88,09%
3	Language	85,51%
Percentage		88,09%
		Very Feasible

Biology teacher response data was collected to see the teacher's response as a user in the classroom. The overall percentage result is 96.25%, with a very feasible category. Thus, this reference book has

reached the standard of the feasibility of teaching materials according to BSNP (2014), which includes four indicators, including aspects of graphics, the effectiveness of reference books, material aspects, and language. This is supported by the research of Ariyanti, Hardiansyah, and Mahrudin (2022), namely research on the development of teaching materials for the Bagridae family fish e-reference books on the concept of Animalia, obtaining media and material validation results on average 91.48% very feasible category. The benefits of using local culture in learning can interpret the learning process and results because students get contextual learning experiences and apperception materials to understand the concept of science in their local culture (Putra, 2017).

The reference book developed can attract readers' attention because biology reference books can make students more enthusiastic and severe in learning to achieve learning success (Patmawati, 2018). The development of local wisdom-based reference books can increase students' knowledge and enthusiasm for learning. This is in accordance with the statement in the research on the development of media e-reference books on Nepenthes species diversity material in the response test obtained results of 4.26 and 4.10 can increase the learning motivation of students and students (Setiawan & Wardhani, 2018). With this reference book, students can enjoy learning by observing objects in Mendut Temple and overcoming the lack of learning resources. As well as for teachers can also maximize Ethno pedagogy-based learning in biology learning and participate in preserving the surrounding culture. The benefits of using local culture in learning can interpret the learning process and results because students get contextual learning experiences and apperception materials to understand the science concept in their local culture (Putra, 2017).

Evaluation

Evaluation is the last step of the ADDIE development model. Evaluation is carried out in each process passed to provide value to the development. Each evaluation will be given revision actions if needed in each process carried out so that the final product is obtained as a reference book suitable as a student companion book (Cahyadi, 2019).

Conclusions

Based on the data obtained and the discussion of research on the identification of Pancatantra and Bodhisattva fauna reliefs of Mendut Temple Magelang as a reference book, it can be concluded that the results of fauna identification there are 3 classes identified namely Aves, Reptiles and Mammals, the results of the feasibility test of reference books are categorized as very feasible with the acquisition of a percentage of 97.82%, while in the media aspect it gets results with a very feasible category without the need for revision with an average percentage of 98%. In the biology teacher and student response test, the percentage results were 96.25% with a very feasible category, and the student response test with 88.09% with a very feasible category without the need for revision. This shows that the reference book developed is very feasible in accordance with the standards of the National Education Standards Agency (BSNP). Future research is expected to identify fauna up to the species level with more in-depth research and implementation to see the effectiveness of the product in biology learning.

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