

The Development of Teaching Materials Based on Bali Local Wisdom in Environment Conservation

Kadek Sera Harlistya Udayani, Siti Sriyati

Universitas Pendidikan Indonesia
seraharlistya@upi.edu

Abstract

Teaching material is a component that has an important role in learning in the classroom. Students need contextual teaching materials to make it easier for them to understand the material. The development of teaching materials based on local wisdom in Bali aims to create teaching materials that are appropriate to the geographical and social environment of students. The aims of this study are to determine the process of development, to determine the feasibility and students' response to teaching materials based on local wisdom in Bali for first grade of senior high school. This teaching materials uses the ADDIE development model which consists of five steps. ADDIE steps include analysis, design, development, implementation, and evaluation. The development of teaching materials based on suitable materials, suitable presentation, suitable language, and suitable graphics from the National Education Standards Agency (BSNP). The instrument used to get the validity of teaching materials based on validation, students' and teacher responses are questionnaire of validation sheet and students' response sheet. Data analysis using qualitative descriptive. An expert review of the results of the assessment shows a value of 88,33% (valid) for expert material and 88,17% (valid) for media experts. Meanwhile the result of students' response is 84,47% which categories is "very strong". Based on validity results by reviewers and students' response, then teaching materials based on Bali local wisdom in environmental conservation can be use for biology learning. Further research is recommended to look at the impact of this teaching materials on 21st century skills of high school students.

Keywords: teaching materials, local wisdom, Bali

1. INTRODUCTION

The function of education is to preserve a positive cultural heritage (Budhisantoso, 1992). The core values of culture can be used by the younger generation to face the challenges of future life. The issue of education in this case is how the core values of culture can be formulated and linked in education (Alwasilah, Suryadi, & Karyono, 2009).

At present education in Indonesia, especially in Bali, has not been able to function as a relay from culture. Bali has a lot of local wisdom which contains the values of preservation of the environment. But in reality, the environment in Bali has a lot of pollution and the conversion of green land. The preliminary study conducted on February 4, 2019 was conducted in one of the high schools in Denpasar, Bali, finding the fact that students have a moderate level of knowledge of environmental issues in Bali and knowledge of local wisdom, especially Tumpek Wariga. This is one of the effects of less optimal transmission of values of local wisdom on environmental preservation in education.

The economic growth of Bali Province is mostly supported from the southern region (Badung Regency) and central (Denpasar City). Where in the area is the main tourist destination area on the island of Bali. When compared with other districts in Bali, Denpasar City is the area with the most

land conversion. The shift in function of land that has been built in Denpasar City mostly occurs in the area of green open space. The area of conversion of green land in Denpasar City is 32.38 Ha. The occurrence of land conversion in Badung Regency and Denpasar was due to the high demand for development land originating from population growth and tourism activities (Bali, & UNUD, 2005). Transfer of land functions that occur has a major impact on environmental changes physically and socially.

Efforts to preserve the environment and reforestation have been carried out by ancestors on the island of Bali and inherited as local wisdom. One of the local wisdom of Hindus in Bali in the context of environmental preservation and reforestation is Tumpek Wariga. This local wisdom is a form of gratitude and a form of respect for plants which have provided great benefits for life. Through this ceremony, Hindus in Bali began to learn to plant and maintain plants. In the context of Tumpek Wariga's local wisdom, plants as objects and humans as subjects. The integration of local wisdom values into environmental teaching materials is a means to direct students in shaping the character of students so that they have personality intelligence and morality and are good at the environment.

Many ways can be done to integrate Tumpek Wariga's local wisdom values in biology learning in high school. One of them can be contained in teaching materials. Teaching

materials or textbooks are one of the sources to support the implementation of the learning process in the classroom. Textbooks can help students understand the material (Subhan, 2017). Teaching materials used in learning environmental material must be relevant to the conditions of the students given the different natural and ecological conditions in each region. Teaching materials used in schools currently do not contain local insightful information. Teachers need to innovate on local context-based environmental teaching materials.

Teaching materials developed were adjusted to the context of Tumpek Wariga local wisdom value. In the 2013 curriculum at the high school level, the value is in accordance with 2 basic competencies, namely, 3.11 and 4.11. Basic competency 3.11 analyzes data on environmental changes and causes, and the effects of these changes on life. Basic competency 4.11 is to propose the idea of solving environmental change problems in the context of environmental problems in the area.

The purpose of this study is to develop contextual teaching materials based on local wisdom in Bali that are feasible based on expert validation, responses from teachers and students as users of teaching materials.

2. METHOD

This research is development research. This development research uses the ADDIE method from Dick, Carey, and Carey (2005). In this method include 4 stages, namely analysis, design, development, implementation and evaluate.

2.1 Analysis

The analysis phase carried out by the author includes three things, namely analyzing Tumpek Wariga's local wisdom, curriculum analysis and student knowledge analysis. The local wisdom analysis phase begins with a literature study. Data is collected through observation, documentation, and interviews. All forms of data obtained are used as material to compile teaching materials on environmental change in Bali based on local wisdom of Tumpek Wariga.

Curriculum analysis is carried out on the current high school curriculum, namely Curriculum 2013. Curriculum analysis is carried out through the assessment of basic competencies so as to obtain the expected learning objectives.

Things that are taken into consideration in analyzing student characteristics are student knowledge related to Tumpek Wariga's local wisdom and understanding related to environmental change material. Analysis of students' initial knowledge makes it easy to plan for anything and how much information needs to be included in the teaching material.

2.2 Design

The second stage in developing teaching materials is the design stage. The design of teaching materials is based on the results at the analysis stage. The values of environmental

preservation in local wisdom are integrated in teaching materials. At this stage a concept map of environmental change will be prepared, and continued to develop macro and micro structures of teaching materials.

2.3 Development

In the third stage is developing teaching materials. At this stage, the development of teaching materials was carried out, then continued with product validation. Aspects assessed in the validation of teaching materials are the suitability of material, language and graphics.

2.4 Implementation

The fourth stage is the implementation of teaching materials carried out in one of the high schools in Denpasar, Bali. Implementation of teaching materials applied to 36 first grade of senior high school. The implementation phase is divided into 2, namely small scale and large scale implementation. Small-scale implementation was carried out to determine the level of readability of teaching materials using the hitch test from Taylor (1953). Then proceed with the stage of implementation of large-scale teaching materials for students of class X IPA. At this stage also asks students' responses to local wisdom-based teaching materials.

2.5 Evaluation

The last stage is the evaluation stage. The evaluation phase is very important to ensure the achievement of the objectives of the use of teaching materials developed. The instruments used in this study included a validation sheet for material experts and technology/ media experts. Assessment of teaching materials is also carried out by biology teachers as users. The teaching material validation sheet uses teaching material standards from the National Education Standards Agency (BSNP). The questionnaire was used to get students' responses as users of the products developed.

Data on the validation of teaching materials by the reviewers were analyzed through averages. The average value is interpreted in the standard teaching material from the Badan Standar Nasional Pendidikan (BSNP). Teaching materials are declared to have passed if they meet the assessment criteria in the aspects of material content and graphics, with the following criteria.

- a. The component of content eligibility has a minimum average value of 2.75 for each subcomponent.
- b. In the language component, presentation and graphics have an average minimum score of 2.0 for each subcomponent.

3. RESULTS

Feasibility the developed teaching material was assessed by 3 materials content expert and 2 technology expert. The results of the validation by these experts are as follows.

3.1 Validation of Teaching Materials by Material and Technology Expert

Product validation by the reviewers using instruments that have been made at the design stage. Revisions and suggestions from the reviewers will be used as material to improve teaching materials. Revised teaching materials will be tested on a limited scale to students. The results of the feasibility test for teaching materials can be seen in Table 1.

Table 1. Results of Teaching Material Validation

Material Expert Assessment	Percentage (%)	Average	Category
Feasibility of the content aspect			
Compatibility of material with standard competence and basic competence	86,11%	3,44	Valid
Material accuracy	88,09%	3,52	
Material update	91,66%	3,66	
Feasibility aspects of presentation			
Presentation Techniques	79,17%	3,17	Valid
Support Presentation	90%	3,6	
Contextual			
Contextual nature	100%	4	Valid
Contextual Component	83,33%	3,33	
Average	88,33%	3,53	Valid
Technology Expert Assessment			
Content Feasibility			
Teaching Material Size	75	3	Valid
Design of teaching material cover	94,54	3,78	
Design of teaching materials	90,63	3,63	
Language Feasibility Aspects			
Straightforward	95,83	3,83	Valid
Communicative	87,5	3,5	
Dialogue and interactive	93,75	3,75	
Compatibility with the development of students	75	3	
Compatibility with language rules	93,55	3,75	
Use of terms and symbols	87,5	3,5	
Average	88,17	3,53	Valid

Based on Table 1. it can be seen that the assessment of material experts obtained an average of 3.53 from a maximum of 4.00 with a percentage of 88.33%. While the assessment of technology experts obtain an average of 3.53 from a maximum of 4.00 with a percentage score of 88.17%. Based on the feasibility criteria from BNSP that the average value above 2.75 is included as a feasible category, the teaching materials developed can be tested at a later stage. The following is the display of teaching materials that were developed and validated by the validators.

Teaching material for environmental change in Bali is based on local wisdom of Tumpek Wariga which has been validated by the reviewers and then revised according to the

input from the reviewers. Input from the reviewers such as paying attention to conjunctions on the concept map, changing some sentences that are less effective, and including the source for each definition of the term.

On the cover of teaching materials Changes in the environment in Bali based on the local wisdom of Tumpek Wariga (Figure a.) there are several images that represent the environmental conditions in Bali. The pictures contained in the cover of teaching materials are images of beautiful Balinese scenery, images of environmental changes in Bali due to natural and human disasters and a ceremony of local wisdom. The purpose of displaying these contrasting images as an attraction to students so that they realize that actually behind its beauty, the island of Bali has suffered a lot of damage.

Teaching materials for environmental change in Bali are based on Tumpek Wariga's local wisdom which has been validated by the validator and then revised according to the input from the validator. After making revisions to the teaching material, the next test was conducted (readability test) to determine the level of readability of the teaching materials developed.

3.2 Teaching Material Readability Level

Readability test by using a cloze test was conducted on a limited scale trial of 36 students. The results of the overlay test on local wisdom-based change and environmental preservation teaching materials in Bali are briefly presented in table 2.

Table 2. Teaching materials readability test results

Section	Topic	% average readability level	Category
Section I	About causes of environmental changes	95.45%	High
Section II	About types of waste	96.48%	High
Section III	About environmental changes in Bali	94.72%	High
Section IV	About effect of land use in Bali	90.78%	High
Section V	About management of the environment based on Bali local wisdom	99.50%	High
Average		95.39%	High

The results of the cloze test in Table 3 show that the average readability in each part is in the high category. According to Rankin and Culhane (1969), the readability score is > 60%, indicating teaching materials are at a free level. This means that teaching materials are easy to understand and can be used independently by readers. In addition, the high level of readability of teaching materials for environmental change and environmental preservation based on Bali's local wisdom shows that teaching materials are worthy of testing in large samples.

3.3 Validation of Teaching Materials by Biology Teacher

The teacher's response to local wisdom-based teaching materials is mixed with digits through the assessment sheet. The biology teacher who was made the resource person consisted of two teachers who taught at the school where the research was conducted. The results of the teacher's assessment of teaching materials are presented in the following Tabel.

Table 3. Results of teacher material validation by the teacher

Indicator	Rating Item	Average	Average Per Indicator
Language Feasibility	Straightforward	87,5%	87,5% (very strong)
	Communicative	87,5%	
	Dialogue and interactive	93,75%	
	Conformity with the development of students	81,25%	
	Conformity with language rules	93,75%	
Use of terms and symbols	81,25%		
Feasibility of Presentation	Presentation Techniques	100%	97,5% (very strong)
	Support Presentation	95%	

The results of the teacher's response to aspects of the language amounted to 87.5%, the value included in the category of very strong. While the average for the feasibility aspect of presentation is 97.5% with very strong criteria. In addition, the teacher provides advice on teaching materials based on local wisdom. The teacher recommends that you pay attention to the suitability of the material contained in teaching materials with the allocation of learning time in the classroom. The teacher also gives advice so that this local wisdom-based teaching material can be reused in learning because it feels very suitable as an alternative teaching material.

3.4 Students' Responses to Teaching Materials

Teaching materials based on local wisdom for environmental preservation in Bali were also responded to by students as users. The results of student assessment of teaching materials can be seen in table 4.

Table 4. Students' responses to teaching materials

Aspects of assessment	Percentage	Category
Materials content	85,42%	Very strong
Presentation	84,2%	Very strong
Language	83,79%	Very strong
Average	84,47%	Very strong

Based on table 4.17 it can be seen that students' responses to teaching materials based on local wisdom on the overall environment change material get positive responses. This can be seen from the percentage of responses from each indicator

above 80%. Material aspect indicator obtained an average of 85.42 with very strong criteria. The assessment shows that the material presented in the teaching material is clear, provides understanding and stimulates curiosity and can solve problems. The existence of environmental issues that are contextual close to the environment of students makes it easy for students to understand the material and triggers them to read and solve the problems presented.

Indicator aspects of the presentation of teaching materials obtained an average of 84.20% with a very strong category. Presentation of teaching material that is made clear by the presence of pictures or photos from environmental pollution cases in Bali attracts students' attention to reading, observing, making it easier for them to understand the material presented.

Assessment on the language aspect obtained an average of 83.79% with very strong criteria. The assessment is based on the use of language in accordance with the level of understanding of students to be easily understood. In teaching material not only provides the main material but is added with supporting material columns that can clarify and broaden students' insights.

4. CONCLUSION

Changing teaching materials and environmental preservation based on the local wisdom of Bali Materials have been successfully developed. Teaching materials developed have passed the validation stage by material and technology experts. Teaching materials qualities based on the results of the assessment of material experts in a feasible category to be tested with 88.17% feasibility percentage, assessment of technologists in feasible categories with a percentage of 90.08%, and teacher assessment as users in a feasible category with a percentage of 91.47% developed to be eligible and feasible to be used by class X high school students. The teaching materials for environmental change developed have readability with a high category. Improvements in teaching materials are in accordance with the principles and input of the validator, the results of the trial are limited, and large-scale trials have been carried out.

5. REFERENCES

- Alwasilah, A. C., Suryadi, K., & Karyono, T. (2009). *Etnopedagogi: Landasan praktek pendidikan dan pendidikan guru*. Bandung: Kiblat Buku Utama.
- Budhisantoso, S (1992). Pendidikan Indonesia berakar pada kebudayaan nasional. Paper Presented At The Indonesian National Education Convention. Medan.
- Dick, W., Carey, L., & Carey, J. O. (2005). *The systematic design of instruction*. London: Pearson
- Bali, B. P., & UNUD, P. (2005). *Status lingkungan hidup daerah provinsi Bali*. Denpasar: Pemerintah Provinsi Bali.

- Rankin, E. F., & Culhane, J. W. (1969). Comparable cloze and multiple-choice comprehension test scores. *Journal of Reading, 13*(3), 193-198.
- Subhan, A. (2017). *Pengembangan bahan ajar berbasis nilai-nilai kearifan lokal pertanian padi di Cirebon untuk meningkatkan literasi lingkungan siswa SMP* (Master thesis). Retrieved from <http://repository.upi.edu/29912/>
- Taylor, W. L. (1953). "Cloze procedure": A new tool for measuring readability. *Journalism Bulletin, 30*(4), 415-433.