Development of Science Learning Material Based on Local Wisdom on Plant Tissues' Structure and Function Topic in Class VIII SMP

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ABSTRACT

This study discusses learning science learning with local wisdom of South Kalimantan. At SMPN 9 Banjarmasin there are no teaching materials that link local wisdom, especially funding the Network Structure and Function Material. Therefore, research on the development of teaching materials based on local wisdom IPA. This study aims to describe: (1) the validity of junior high school science teaching materials based on the results of validation, (2) the practicality of junior high school science teaching materials based on the questionnaire response, and (3) the effectiveness of junior high school science teaching materials based on the test results of students studying. This study uses a 4D development model consisting of defining, designing, developing and implementing. However, at the time of this study only reached the development stage only because of time constraints and limited funds. The results showed the validity of teaching materials obtained a percentage of 89.61% with a very valid category. Practicality of teaching materials is obtained an average of 3.46 with practical categories, and the effectiveness of teaching materials is obtained based on N-Gain calculations which is 0.70 with moderate / effective categories. Based on the results of the assessment and the average value obtained, it can be concluded from the science teaching materials based on local wisdom that are declared very valid, practical, and effective so that they are suitable for use in the learning process.

Keywords: Teaching Material, Local Wisdom

ABSTRAK

Penelitian ini dilatar belakangi pembelajaran IPA dikaitkan dengan kearifan lokal Kalimantan Selatan. Di SMPN 9 Banjarmasin belum ada bahan ajar yang mengkaitkan tentang kearifan lokal terutama menganai Materi Struktur dan Fungsi Jaringan. Oleh sebab itu, dilakukan penelitian pengembangan bahan ajar IPA berbasis kearifan lokal. Penelitian ini bertujuan untuk mendeskripsikan : (1) validitas bahan ajar IPA SMP berdasarkan hasil dari validasi, (2) kepraktisan bahan ajar IPA SMP berdasarkan angket respon, dan (3) keefektifan bahan ajar IPA SMP berdasarkan hasil tes belajar peserta didik. Penelitian ini menggunakan model pengembangan 4D yang terdiri dari tahap pendefinisian, perancangan,

pengembangan dan penyebaran. Namun, pada penelitian kali ini hanya sampai pada tahap pengembangan saja dikarenakan keterbatasan waktu dan keterbatasan biaya. Hasil penelitian menunjukkan bahwa validitas bahan ajar memperoleh persentase 89,61% dengan kategori sangat valid. Kepraktisan bahan ajar memperoleh rata-rata sebesar 3,46 dengan kategori praktis, dan efektifitas bahan ajar diperoleh berdasarkan perhitungan N-Gain yaitu 0,70 dengan kategori sedang/efektif. Berdasarkan hasil dari persentase dan nilai rata-rata yang diperoleh, dapat disimpulkan bahwa bahan ajar IPA berbasis kearifan lokal dinyatakan sangat valid, praktis, dan efektif sehingga layak untuk digunakan dalam proses pembelajaran.

Kata Kunci: Bahan Ajar, Kearifan Lokal.

BACKGROUND

Science learning is needed to build a conductive learning atmosphere and environment, one of which is by combining science learning with local wisdom. With local wisdom, students can study and analyze local wisdom scientifically, so that students have the awareness to protect and preserve the surrounding environment by being linked to the science learning material they receive. Local wisdom is a culture from the past that has been carried out for generations and used as a guide to life (Sartini, 2006). The values of local wisdom adopted by the community are sometimes ignored in various learnings, one of which is science learning at school, so that science learning becomes less meaningful for students (Suastra, 2010).

Education based on local wisdom is education that uses the values and cultural wealth owned by the local community which is used as capital for the development of learning activities, (Martawijaya, 2015). Indonesia has a multicultural culture so that there is a lot of local wisdom owned by the Indonesian people, but local wisdom in Indonesia is rarely linked in science learning, making students less understanding the meaning of cultural characteristics in Indonesia.

One of the local wisdom of the people of South Kalimantan is the knowledge of traditional medicine using plants inherited by nature. South Kalimantan has natural wealth in the form of vast forest resources and potential found in nature, unfortunately the forest area in South Kalimantan is gradually decreasing, as well as its natural potential. Medicinal fileiat forest plants (THBO) are widely found in South Kalimantan forests, one of which is the Eurycoma *longifollan* jack plant which is often used as THBO to be famous for its efficacy abroad, in addition to Eurycoma longifolia, there are still many plants used as traditional medicine (Noorcahayani, 2012). Medicinal forest plants are used from roots, stems, leaves, flowers to fruits. This medicinal plant can be attributed to the material structure and function of plants

In the material structure and function of plants related to medicinal forest plants, it can be developed into teaching materials to help students in the learning process and get to know local wisdom owned by the people of South Kalimantan. Science teaching materials based on local wisdom can help students in greeting information about local wisdom in southern Kalimantan, especially using medicinal forest plants.

Based on the results of Noor Aini's (2018) research on the development of teaching materials and classroom trials, it was concluded that science teaching materials using a cooperative learning model oriented to the wetland environment are suitable for use in learning. This is determined based on the results of research findings as follows: (1) The validity of the teaching material developed is classified as valid with valid categories based on the results of the assessment of practitioners and academics, (2) The practicality of the teaching material developed is classified as practical with a good category based on the results of observations of the implementation of RPP, (3) The effectiveness of the developed teaching material is classified as effective, based on the results of learning products with medium categories and the results of learning processes with Good Categories

Based on the above problems, the author tries to research the development of teaching materials. The teaching materials to be developed are. "Development of Science Teaching Materials Based on Local Wisdom on Plant Tissue Structure and Function Material class VIII Junior High School

RESEARCH METHODS

This type of research is research on development which is often known as *Rasearch &*; Development (R &; D). From this development research aims to produce a product in the form of teaching materials on plant structure and function material. This study used a model developed by Thiagarajan and Semmel (1974), namely from the 4-D model.

This model consists of 4 stages of development, namely *Define* or Definition, Design or *Design*, *Develop* or Development and *Desseminate* or Deployment (Bustang. 2010). Then this development model will be reduced to a 3D development model by reducing the deployment stage due to time and cost constraints budgeted in research.

The definition stage (*Define)* aims to determine what products will be developed along with their specifications, this stage includes needs analysis carried out through literature studies and research. The design stage aims to make plans for the product that has been set. The development stage (*Develop)* aims to make the design into a product and test product validation repeatedly until a product is produced that meets the specifications set

This research time will be carried out in the odd semester of the 2019/2020 academic year from August to September 2019. The research site was carried out at SMPN 9 Banjarmasin which is located at Jl. Batu Benawa Raya No 29, RT 76 Teluk Dalam, Central Banjarmasin District, Banjarmasin City, South Kalimantan. The research instruments used in collecting this research data are: (1) teaching material validation sheets which include the content and validation of teaching materials (2) RPP validation sheets, (3) LKPD validation sheets, (4) learning outcome test validation sheets, (5) learning outcome test sheets, (6) student response questionnaire validation sheets, (7) student response questionnaire sheets.

The data obtained is then analyzed descriptively and qualitatively, namely by calculating the percentage of the score of the developed teaching materials.

$$persentase\ validasi = \frac{\text{Jumlah skor yang diperoleh}}{\text{Jumlah skor maksimal}}\ x\ 100\%$$

Then it is compared with the specified validity criteria. The criteria table is in Table 3.1

Table 1 Valid Criteria

Validity Criteria	Category
85,01% - 100,00%	Highly Valid

Validity Criteria	Category
70,01% - 85,00%	Quite Valid
50,01% - 70,00%	Less Valid
01,00% - 50,00%	Invalid

(Akbar, 2013)

To get the reliability of the assessment, the formula (*percentage of agreement*) can be used can be seen from the following formula:

$$percentage\ of\ agreement = 100\% \left[1 - \frac{A - B}{A + B}\right]$$

Information:
A = highest score given by validator
B = lowest score given by validators

Table 2. Reliability Criteria

Validity Criteria	Category
81,00% – 100,00%	Excellent
61,00% - 80,00%	Good
41,00% - 60,00%	Good enough
21,00% – 40,00%	Not Good
00,00% - 20,00%	Bad

(Akbar, 2013)

The practicality analysis of the results of student responses is calculated using the following equation:

$$Average = \frac{gained\ score}{maximum\ score}$$

Table 3 Assessment criteria for Student Response

Interval	Criterion
$3.25 \leq x < 4.00$	Excellent
$2.50 \leq x < 3.25$	Good
$1.75 \leq x < 2.50$	Good enough
$1.00 \leq x < 1.75$	Less

(Suyidno, 2012)

The effectiveness of the module is measured from the test of student learning outcomes by conducting pre-test and *post-test* to determine the improvement of the test of cognitive learning outcomes of students using the following equation:

$$(g) = \frac{skor\ posttest - sko\ \ pretest}{skor\ maksimum - skor\ pretest}$$

The effectiveness criteria of student learning outcomes can be seen in the following table:

Table 4. Learning Effectiveness Criteria

Value	Criterion
$(g) < 0.3$	Low/moderately effective
$0.70 > (g) \geq 0.3$	Medium/effective

(g) ≥ 0.7	High/highly effective

(Hake, 1998)

RESULT AND DISCUSSION

Science teaching materials on plant structure and function materials based on local wisdom at the SMP/MTs level have been developed. Science teaching materials are then carried out expert validation, simulations and class trials to produce valid, practical, and effective teaching materials. The following is a description of the results of the development of teaching materials and the results of class trials and their discussion

Research Results

The results of the development of science teaching materials are used to support the learning process of students on plant structure and function materials at the SMP / MTs level. The science teaching materials developed are loaded with local wisdom of plants with medicinal properties typical of South Kalimantan. The teaching materials were then reviewed by Syubhan Annur, M.Pd and Rezky Febriyani Putri M.Pd as supervisor 1 and as supervisor 2. The development of this teaching material includes steps in accordance with the stages of the 3D model, while the results of the steps of the 3D model can be seen below:

Defisina Stage (Define)

The Definition Phase is the initial stage of the 4D model. This stage is carried out to define the development requirements, namely by analyzing the curriculum, analyzing students and formulating learning goals.

Design Stage

At this stage is to prepare a prototype of learning tools in the form of teaching materials based on local wisdom about medicinal plants. This stage consists of three steps , namely test preparation, media selection, format selection.

Development Stage

At the development stage (*Develop*) aims to make the design into a cool product with product validation stages according to field experts, simulation stages are carried out in small classes, and product trials in large classes, until products are produced according to the specifications set. The development steps can be seen in the results below:

Validation results of Teaching Materials

Validation of teaching materials is carried out to determine the feasibility of the developed teaching materials and then revisions are made to the recommendations provided by validators. The validation of this teaching material is based on assessment aspects such as the format of teaching materials, language, content of teaching materials, presentation and benefits / uses of teaching materials. This teaching material was validated by Drs. Maya Istiyadji, M.Pd, Ratna Yulinda M.Pd and Sauqina, S.Pd., M.A as lecturers of science education FKIP Universitas Lambung Mangkurat. The results of the validation analysis of teaching materials can be seen in Table 4.1.

Table 4. 1 Validation Results of Teaching Materials

Assessment Aspect	Average	Category
Format of teaching materials	3,38	Good
Language	3,30	Good
Content of teaching materials	3,36	Good
Serving	3,51	Excellent
Benefits/uses of teaching materials	3,50	Excellent
Validity	**85,05%**	**Highly Valid**

Reliability	**85,71**	**Tall**

Table 1 above shows that the validation results of teaching materials from the three validators with categories are very valid. The results of the validation obtained very valid teaching materials. Furthermore, the validated science teaching materials are then improved based on the recommendations of the three validators in order to obtain good science teaching materials with improvements so that teaching materials can be tested to find out their practicality.

RPP Validation Results

The results of the analysis of the validation of the learning implementation plan can be seen in the table below:

Table 4. 2 Learning Implementation Validation Results

Assessment Aspect	Average	Category
Format RPP	3,66	Excellent
Language	3,41	Excellent
Fill in RPP	3,62	Excellent
Validity	**89.85%**	**Very Valit**
Reliability	**85,71**	**Tall**

Table 4.2 shows that the results of the validation assessment of the lesson implementation plan which includes aspects of reviewing the format of the lesson implementation planning, language, and content of the learning implementation plan in the category of very valid can be used without revision. The validity value of the lesson implementation plan can be seen in Table 4.2, which is with a very valid category

Student Worksheet Validation Results

The results of student worksheet analysis can be seen in the following table:

Table 4. 1 Student Worksheet Results

Assessment Aspect	Average	Category
Format RPP	3,54	Excellent
Language	3,41	Excellent
Fill in RPP	3,60	Excellent
Validity	**88.76%**	**Very Valit**
Reliability	**85,71**	**Tall**

Tabell 4.3 shows that the results of the student worksheet validation assessment include aspects of reviewing the student worksheet format, language, and student worksheet content in the category of very valid. Can be seen in the table. The validity value in the validation of student worksheets with categories is very valid

Learning Outcomes Test Validation Results

Validation of learning outcomes tests is carried out to determine the effectiveness of THB which will be tested on students. THB validation includes aspects of general construction and validation of question items. The results of the validation analysis can be seen in Table 4.4

Table 4. 2 Learning Outcomes Test Validation Results

Review aspect	Average	Category
General construction	3,42	Excellent
Question Point	3,45	Excellent
Validity	**86,11%**	**Very valid**
Reliability	**85,71**	**Very high**

Furthermore, the results of the THB validation assessment by the three validators with very valid categories. Tests of student learning outcomes that have been validated are improved according to the recommendations of validators, in order to measure the effectiveness of the teaching materials developed

Student Response Questionnaire Validation Results

Validation of student response questionnaires is carried out to determine the feasibility of questionnaires to be used for class trial students. The validation of student questionnaires covers four aspects, namely, instrument format, instrument content, construction, and language. The validation results can be seen in Table 4.5

Table 4. 3 Student Response Questionnaire Validation Results

Assessment aspect	Average	Category
Instrument format	3,60	Excellent
Instrument contents	3,20	Good
Construction	3,66	Excellent
Language	3,11	Good
Validation	**84.16%**	**Very valid**
Reliability	**85,71**	**Tall**

The validation results of the three validators obtained a value of 84.16% with a very valid category. Furthermore, the validated student response questionnaire is then revised in accordance with the recommendations of the three validators so that it can be used for students to measure the practicality of the modules developed

Simulation

Validated teaching materials are then asked for assessment to students through simulation activities. Simulation activities are carried out to obtain input, comments from students / observers to revise the modules produced in previous activities. The simulation was conducted in small classes of 10 students. The simulation results can be discussed below:

The results of simulation activities are input, criticism, and recommendations from simulation observers on teaching materials that have been developed. The results of criticism and recommendations that have been given by students

Table 4. 4 Results of Student Response Questionnaire Simulation

Student Name	Criticism and Recommendation
Learner 1	The picture is bright and the color content is easy to understand
Learner 2	Teaching materials need to be added animation, to make it more interesting
Learner 3	This teaching material is already good, but it is not neat in preparation

Learner 4	This teaching material explanation is easy to understand, but the lack of animation of this teaching material.
Learner 5	This teaching material is already good
Learner 6	This teaching material is interesting because there are many colorful pictures
Learner 7	The material is easy to understand
Learners 8	You see, there are too many
Learner 9	Pictures to be multiplied, to increase enthusiasm for learning
Learners 10	Worksheets on teaching materials make it easy for me to exchange ideas with friends

From the results of criticism and student recommendations, it is then used as input from researchers to make improvements to draft II teaching materials, so that draft III teaching materials are obtained then teaching materials can be used in class trials

Class trial

Class trials are carried out as an effort to obtain input, corrections, and improvements to the draft III module and see practicality and effectiveness in the classroom.

The result of the practicality of teaching materials.

The practicality of teaching materials can be measured using student response questionnaires that are distributed to students. The respondents consisted of 36 students of grade VIIIG SMPN 9 Banjarmasin. Students are asked to fill out questionnaires according to their respective opinions. The response questionnaire used includes three aspects, namely the ease of use aspect, the benefit aspect, and the time efficiency aspect. The results of the analysis of the practicality of teaching materials obtained in Table 4. 7.

Table 4. 7 Results of Practicality of Teaching Materials

No	Assessment Aspect	Average	Category
1	Ease of Use	3,46	Very practical
2	Benefit	3,48	Very practical
3	Learning Time Efficiency	3,45	Very practical
Overall average		**3,46**	**Very practical**

Based on the table above, the ease of use aspect is stated with a very practical category, the benefit aspect is stated with a very practical category, and the efficiency of learning time is stated with a very practical category. Overall stated with very practical categories.

Results The effectiveness of teaching materials

The effectiveness of teaching materials can be measured through tests of student learning outcomes. The Learning Outcomes test consists of 20 multiple-choice questions. The learning outcome test is divided into two, namely the *pretest* is given before using the developed teaching materials and the *posstest* is given after using the developed teaching materials. The effectiveness of the use of teaching materials is seen from the test of student learning outcomes, then obtained by calculating *N-gain* in grade VIII G students. 8

Table 4. 8 Study Test Results

	Pretest	***Posttest***	***N-Gain***	**Category**
Average	**37,08**	**81,52**	**0,70**	Keep

Berdasarkan Table 4. 8 obtained the results that the average pretest score was 37.08 while the *average posttest* score was 81.52, from these results showed that there was an increase in student learning test results. The increase is supported by N-gain analysis so that an effectiveness of 0.70 is obtained in the medium category.

CONCLUSION

Based on the results of development and trials, it can be concluded that the teaching materials based on local wisdom developed are declared valid and suitable for use. This is based on the validation results of three validators with categories: The validity of teaching materials based on local wisdom developed according to validators is valid without revision and worthy of use. The practicality of teaching materials, based on student responses to teaching materials based on local wisdom developed is considered practical to be used in integrated science learning with good criteria. Teaching materials are declared effective, based on the results of student learning tests after using teaching materials based on local wisdom with moderate criteria in the good category. So that it is included in the effective criteria

RECOMMENDATION

Based on the results of this research and development, recommendations that can be given by researchers are as follows: For teachers, teaching materials based on local wisdom developed can be used in the learning process. These teaching materials can help students be actively involved in learning. This teaching material is based on local wisdom so that indirectly learning can be a forum for introducing medicinal plants in South Kalimantan. For students, teaching materials that have been developed can be a learning medium in schools and can be a source of knowledge about medicinal plants in South Kalimantan that are rarely found. For students, this research can be a source for other similar research to produce even better products.

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