Development of Learning Materials on Classification of Living Things Topic Based on Science Literacy and Local Wisdom

Sri Maida Hartati 1*, Maya Istyadji[1], Aulia Ajizah[2]
[1]Science Education FKIP ULM
Jl. Brigadier General. H. Hasan Basri, Banjarmasin City, Indonesia, 70124
[2]Biology Education FKIP ULM
Jl. Brigadier General. H. Hasan Basri, Banjarmasin City, Indonesia, 70124
*Email: srimaidahartati22@gmail.com

ABSTRACT

The purpose of this study was to analyze the validity and consistency of the assessment of teaching materials for classification of living things based on scientific literacy and local wisdom. This research model uses a 4-D development model, with the stages: (1) Define, (2) Design, (3) Develop, and (4) Disseminate. This research is only up to the stage of developing on expert validation. At the expert validation stage, teaching materials were validated by 4 validators. The results of the validity show that the teaching materials developed are very valid with a validity value of 88.77. The consistency of the assessment of teaching materials is categorized as quite reliable with a percentage value of 63%. In the future, further research will be carried out for these teaching materials, such as the trial phase of the development and distribution of teaching materials.

Keywords: development, teaching material, scientific literacy, classification of living

ABSTRAK

Tujuan penelitian ini ialah menganalisis validitas dan konsistensi penilaian terhadap bahan ajar materi klasifikasi makhluk hidup berbasis literasi sains dan kearifan lokal. Model penelitian ini menggunakan model pengembangan 4-D, dengan tahapan: (1) Define (pendefinisian), (2) Design (perancangan), (3) Develop (pengembangan) dan (4) Disseminate (penyebaran). Penelitian ini hanya sampai tahap develop pada validasi ahli. Pada tahap validasi ahli, bahan ajar divalidasi oleh 4 validator. Hasil validitas menunjukkan bahwa bahan ajar yang dikembangkan sangat valid dengan nilai validitas sebesar 88,77. Konsistensi penilaian terhadap bahan ajar berkategori cukup reliabel dengan nilai persentase sebesar 63%. Kedepannya, dilakukan penelitian lanjutan untuk bahan ajar ini, seperti tahap uji coba pengembangan dan penyebaran bahan ajar.

Kata kunci: pengembangan, literasi sains, bahan ajar, klasifikasi makhluk hidup.

BACKGROUND

The learning process of Natural Sciences (Science) must focus on providing direct experience so that students can understand and observe the surrounding environment scientifically. Science is very close to how to find out about nature systematically, mastery of a collection of knowledge in the form of facts, concepts or principles and is a process of discovery (Tias, 2017). One of the fields of science studies studied in schools is inseparable from nature as a source of knowledge. This is because science study materials include natural phenomena related to the activities of living things and their interaction with the surrounding environment.

Science learning in schools aims to make students have organized knowledge, ideas and concepts about the environment obtained from experience through a series of scientific processes. Science literacy is defined as the ability of science literacy, namely being able to understand, communicate (oral and written), and apply the ability of science to solve problems so that they have a high attitude and sensitivity towards themselves and their environment in making decisions based on scientific considerations (Yuliati, 2017). The main key in developing science literacy is to attract student involvement in learning and create a pleasant learning atmosphere so that students are able to learn based on the experiences they have experienced in everyday life that are integrated with the knowledge they have gained from science literacy (Hidayati Fitria &; Julianto, 2018). Therefore, science literacy is very important for every student.

Learning in schools through science learning is expected to develop the ability of students to face the progress of science and technology through science literacy learning. Science literacy is an individual's ability to understand science, communicate both orally and in writing, apply their scientific knowledge to solve problems so that the individual has an attitude and sensitivity towards themselves and their environment (Toharuddin et al., 2011). Students with underdeveloped science literacy skills are able to solve problems in simple and familiar situations, while students who have more developed literacy skills are able to solve problems in complex and less familiar situations (Rahayu, 2014). Therefore, science literacy must be owned by students.

Research on students' science literacy skills on an international scale is organized by the Organization for Economic Co-operation and Development (OECD) through the Programme for International Student Assessment (PISA). The results of the 2015 PISA analysis in mathematics, science, and reading organized by the Organization for Economic Co-operation and Development (OECD) show that the quality of Indonesian education is ranked 69 out of 76 countries (OECD, 2016). For science literacy, Indonesian students ranked 62 out of 69 countries evaluated. Learning that leads to the formation of student science literacy in Indonesia is still lacking (Setiawan et al., 2017). In addition to the PISA results, the quality of Indonesian education in science was also evaluated by TIMSS 2015 which showed that Indonesia was ranked 44 out of 47 countries (Jones et al., 2015). PISA data in 2018 shows that Indonesia is ranked 70th out of 78 countries that took the PISA test with a score of 396 (OECD, 2019). From this assessment, it shows that the quality of science education and science literacy in Indonesia is still low, so there is a need to increase science literacy in students in Indonesia. Science literacy skills must be built by teachers so that they are embedded in students, with

existing science facts, students are expected to be able to have skills in learning, and the ability to make decisions (Betari et al., 2016).

Facts encountered in the field show that students are very good at memorization, but less skilled in applying the knowledge they have in solving problems (Sumarti et al., 2017). Science education in Indonesia emphasizes abstract conceptualization and develops less active experiments, even though both should be proportionally balanced. The low level of science education is shown by the low achievement of the level of science literacy in PISA.

The low science literacy ability of students in Indonesia is also influenced by the selection of teaching materials used in schools. One factor that directly intersects with learning activities and affects the low science literacy ability of Indonesian students is the existence of student learning resources, in this case teaching materials in the form of books, which have been the main source of student learning at school (Kurnia et al., 2014). One important component in learning is teaching materials as a learning resource for students. Majid (2016) said that teaching materials are all forms of materials used to assist teachers in carrying out learning activities. Teaching materials play an important role in the learning process, namely as a medium for delivering information. Science literacy teaching materials contain at least four categories of science literacy, namely science as a body of knowledge, science as a way of investigating, science as a way of thinking, and the interaction of science, technology, and society (Chiappetta et al., 1991).

Good teaching materials are teaching materials that contain science literacy components in a balanced manner. Thus, good teaching materials are needed so that learning objectives are achieved optimally. Wilkinson (1999) suggests that the category of science literacy is close to a balanced proportion, namely 42% for the category of science knowledge, 19% for the investigation of the nature of science, 19% for the category of science as a way of thinking, and 20% for the interaction of science, technology, and society.

PISA's science literacy assessment emphasizes real-life problems (OECD, 2013). One learning model that provides opportunities for students to actively develop understanding of concepts by combining their knowledge with reasoning and thinking skills is inquiry learning. Inquiry learning is also in line with the scientific approach which is the essence of the 2013 Curriculum (Sumarti et al., 2017). Science literacy is not only related to understanding the facts, but also understanding the nature of science and having the ability to inquiry science. The material classification of living things is important in scientific literacy because this material is directly related to living things on earth. Good science literacy skills of learners can be used as a basis for classifying various types of living things that exist today.

In the development of this teaching material, it will raise local wisdom typical of Kalimantan in the form of animals and plants typical of South Kalimantan such as proboscis monkeys and rambai plants, proboscis monkey (Nasalis larvatus wurmb) or Proboscis monkey is an endemic spiesis that inhabits mangrove forests (Mangrove) widely distributed in forests around estuaries or riverbanks in Kalimantan. In South Kalimantan, Proboscis monkeys can be found in swamp forest areas, or estuaries and riverbanks of Pulau Kaget and Pulau Laut. In South Kalimantan, Proboscis monkeys have been registered as protected animals by Indonesian and world legislation. Proboscis monkeys belong to the family Cercopithecidae, genus Nasalis, species Nasalis Larvatus. and Rambai plant (Baccaurea motleyana) is a type of fruit and plant that grows wild or half in the gardens of Southeast Asia, such as Thailand, Malaysia, and

Indonesia (especially Sumatra and Kalimantan). Rambai belongs to the family Phllanthaceae, genus Baccaurea, species B. motleyana.

Based on this background, most of the circulating teaching materials used in schools have not contained components of science literacy, namely concepts, contexts, processes, and attitudes in a balanced manner. Thus, researchers intend to develop teaching materials in the form of modules that have a composition of science literacy and local wisdom so that they are easy to understand, valid, practical and effective for junior high school students. The results of the development of literacy as a trunk hopefully can provide benefits in the form of information and references for the use of teaching materials for modules based on science literacy and local wisdom in the classification of living things in junior high school science.

The purpose of this study is to analyze the validity of teaching materials for classification of living things based on scientific literacy and local wisdom and analyze the consistency of assessment of teaching materials for classification of living things based on scientific literacy and local wisdom.

RESEARCH METHODS

This type of research is a development research that develops teaching materials for the Classification of Living Things based on scientific literacy and local wisdom. According to Borg & Gall (1983), educational development research is a process used to develop and validate educational products. Richey & Klein (2007), mention that development research is a systematic study, development process, and evaluation with the aim of creating an empirical basis, for the creation of products. The purpose of research development is not to test theories or formulas but to develop products that are effectively used during teaching and learning activities (Silalahi, 2017). This research model for developing teaching materials based on science literacy and local wisdom uses the 4D development method (Define, Design, Develop, Disseminate). The 4D development model has four stages passed, namely, define, design, develop, and disseminate (Thiagajaran, et al., 1974). The stages of the 4D development model can be seen in Figure 1. The research carried out is up to the development stage (development) on expert validation only.

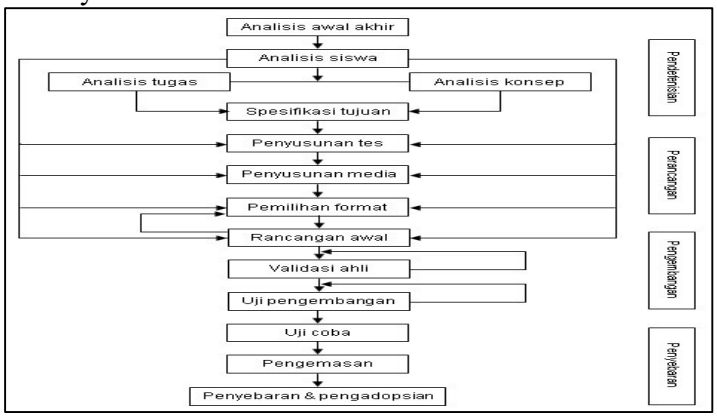

Figure 1. Stages of the Development model (Trianto, 2007)

The research instrument used is the module validation sheet, in this module validation sheet has 3 categories of aspects assessed, namely linguistic, technical, and content aspects. This module validation sheet has 31 questions. The validation sheet is in the form of a Likert scale of 1 to 5 which is a benchmark for the validity of a module that has been developed. The developed module is validated by 3 validators.

The validation data was analyzed in several stages as follows (Ernawati &; Sukardiyono, 2017):

(1) Calculates the percentage of assessment score results on each statement item

$$Hasil = \frac{total\ skor\ yang\ diperoleh}{skor\ maksimum} \times 100\%$$

(2) Calculates the total score from validator assessment results

$$\bar{x} = \frac{\sum x}{n}$$

Information:
$\bar{x}$: Average score
$\sum$x: the total score of each statement
n: number of appraisers

(3) Determine validity categories based on the following criteria (Arikunto, 2009)

Table 1. Criteria for the Validity of Teaching Materials

Score in Percent (%)	Validity Categories
< 21	Very invalid
21-40	Invalid
41-60	Quite valid
61-80	Valid
81-100	Very valid

Analysis of reliability data using the approval percentage formula proposed by Borich (1994).

$$PA = \left(1 - \frac{A - B}{A + B}\right) 100\%$$

Information:

PA: Percentage Agreement

A: Highest score from validator

B: Lowest score by validator

RESULT AND DISCUSSION

In research on the development of teaching materials, classification materials for living things based on scientific literacy and local wisdom aim to make the products developed valid. This development research uses 4-D models (Define, Design, Develop, and Disseminate). The results of this module development research are explained as follows.

1. Define

At this define stage, it aims to establish and define the conditions for learning. This stage includes five steps, namely:

a. End-to-End Analysis

This stage aims to make researchers know the basic problems in the development of teaching materials based on science literacy and local wisdom.

b. Student Analysis

This stage is carried out so that the module teaching materials developed are appropriate sarecommendation. This stage seeks information about the characteristics of students such as the development and ability of knowledge, motivation in learning, educational background, social life, experience and economy.

This module is used for students of Junior High School Class VII Semester 1 (Odd). The teaching materials of this module are specifically for students who attend school in the South Kalimantan region, this is because this module is based on local wisdom from South Kalimantan, namely animals and plants of South Kalimantan. However, it is also possible that students from outside South Kalimantan use teaching materials for this module.

Each student participant has different characteristics and abilities, so that the treatment in learning is also different, the same treatment for all students will result in less optimal learning process (Alfian & Sudarma, 2014). Planning learning that suits the character of students is very important.

c. Task Analysis

Task analysis is useful for analyzing the main tasks performed by learners. The analysis of this task consists of an analysis of core competencies (IC) and basic competencies (KD) on the Classification of Living Things material developed in teaching materials. The task analysis refers to the 2013 revised 2017 curriculum. The Core Competencies (IC) achieved are; (KI 1) Respect and live the teachings of the religion they follow, (KI 2) Show honest, disciplined, responsible, caring behavior (tolerance, mutual assistance), polite, confident, in interacting effectively with the social and natural environment within the reach of association and existence, (KI 3) Understand knowledge (factual, conceptual, and procedural) based on curiosity about science, technology, art, culture related to visible phenomena and events, and (KI 4) try, process, and present in the concrete realm (using, decomposing, arranging, modifying, and creating) and abstract realm (writing, reading, calculating, drawing, and composing) according to what is learned in other schools of the same point of view / theory.

Basic Competencies (KD) that will be achieved on the subject of science in accordance with the syllabus of class VII Junior High School, namely: (KD 3.2) Classify living things and objects based on observed characteristics. (KD 4.2) Presents

the results of classifying living things and objects in the surrounding environment based on observed characteristics.

d. Concept Analysis

Concept analysis aims to determine the material in the teaching materials of the developed module. Concept analysis is presented in the learning concept map, it is useful for the achievement of competencies. The concept map of the material Classification of Living Things can be seen in Figure 2.

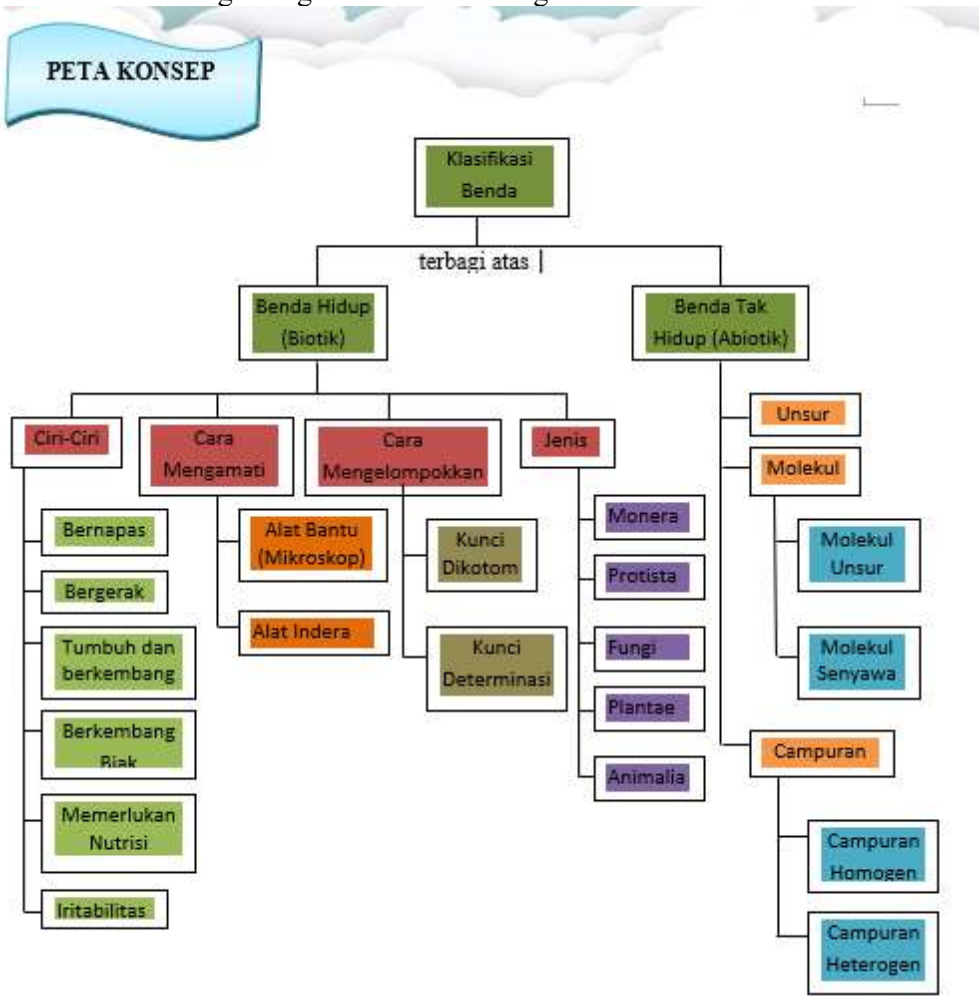

Figure 2. Concept Map of Classification of Living Things

e. Specification of Learning Objectives/Formulation of Learning Objectives

The formulation of indicators and learning objectives for module development can be seen in table 2.

Table 2. Learning Indicators and Objectives

Indicators	Purpose
3.2.1. Present the results of observations, identify, and communicate the results of their observations.	3.2.1.1. Students can present observations, identify, and communicate their observations
3.2.2. Describe surrounding objects that are natural	3.2.2.1. Students can explain objects around them that are natural.
3.2.3. Describe surrounding objects that are man-made.	3.2.3.1. Students can explain surrounding objects that are man-made
3.2.4. Describe objects that are complex and simple.	3.2.4.1. Students can explain objects that are complex and simple
3.2.5. Explain the uses of different types of objects around.	3.2.5.1. Students can explain the uses of various types of objects around.
3.2.6. Make observations of living and non-living things.	3.2.6.1. Students can make observations on living things and non-living objects
3.2.7. Explaining the characteristics of living things	3.2.7.1. Students can explain the characteristics of living things.
3.2.8. Explain the difference between living things and non-living things.	3.2.8.1. Students can explain the difference between living things and non-living things.
3.2.9. Make observations of various living things around it.	3.2.9.1 Students can make observations of various living things around them.
3.2.10. Explain the characteristics of living things around it.	3.2.10.1. Students can explain the characteristics of living things around them.
3.2.11. Grouping living things according to the principle of classification.	3.2.11.1. Students can group living things based on classification principles

2. Design (Designing)

The purpose of this stage is to design a product in the form of modules. This stage has several steps, namely:

a. Test Preparation

The preparation of the test is based on the learning objectives and material contained in the module teaching materials developed. Test instruments are used as a benchmark for achieving learning. The test is conducted at the end of each meeting, where there are 5 meetings in the module. Test results are a picture of understanding that students understand after the learning process.

b. Making Teaching Materials

This stage aims to identify teaching materials that are relevant to the characteristics of the material and in accordance with the needs of students. This can help learners in achieving learning objectives. The teaching materials developed are in

the form of visual media, namely modules. The teaching materials for this module use A4 size paper, Candreeva typeface, Tw Cen MT, Times New Roman, and Dino Topia, with a font size of 12 pt. Making module teaching materials using the Microsoft Word application, and for the home page designed using the Adobe Illustrator application.

c. Format Selection

Modules are arranged based on aspects of science literacy and local wisdom. Local wisdom that is inserted is typical plants and animals of South Kalimantan. Modules contain learning materials as reading materials and knowledge for students. Student worksheets in order to train student literacy. Summary aims to remember the main ideas of the material that has been conveyed. Knowledge test questions aim to find out students' understanding and knowledge of the lesson. The teaching materials of the developed module can be seen in Figure 3.

Figure 3. Format of Module Material Classification of Living Things

3. Develop

There are two steps at this stage, namely:

a. Expert Validation

Expert validation aims to obtain recommendations for improving learning tools which are then developed according to recommendations from experts (Thiagajaran, et al., 1974). It is hoped that the validated modules can be more effective, precise, and can compete with other modules. The results of the validity of module teaching materials can be seen in Table 3.

Table 3. Results of the Validity of the Classification of Living Things module

Aspects	**Validity**	**Category**
Language	92,14	Highly Valid
Technical	80,42	Valid
Content	93,75	Highly Valid
Results of Validity of Teaching Materials	88,77	Highly Valid
Reliability	63%	Quite Reliable

The results of the validity of teaching materials for the Classification of Living Things module have a very valid category with a validity value of 88.77. In the linguistic aspect, it has a very valid category with a value of 92.14, the technical aspect with a value of 80.42 which is

a valid category, and the content aspect with a value of 93.75 is categorized as valid. While the reliability is at a percentage of 63% which is categorized as quite reliable.

The teaching materials developed get recommendations and input from experts or validators so that teaching materials will be even better in the future. These improvements are in the form of matching the image size with the needs in the material and tasks presented and providing information on each image, the suitability of the layout and format of the text with the paper size, correcting writing errors, using fonts and text sizes consistently, the difficulty level of evaluation questions is more even, using Indonesian in accordance with the general guidelines for spelling Indonesian (PUEBI), adjust the font size of the title, sub-headings, and content of the manuscript with the needs of the module, improve the front page (cover). The cover before and after the repair can be seen in Figure 4.

(a) (b)

Figure 4. (a) Cover before revision, (b) Cover after revision

The characteristic of the Classification of Living Things module is that this module contains scientific literacy and local wisdom typical of South Kalimantan. In the teaching materials, this developed module has parts, namely teaching materials, let's solve it!, at a glance info, summaries, and knowledge test questions. In the teaching material section, it contains aspects of science literacy, namely knowledge, there is content, this content contains material

in the field of biology, namely the classification of living things. In this material section, local wisdom is also inserted, namely animals and plants typical of South Kalimantan such as proboscis monkeys, alabio ducks, papuyu fish (betok), swamp buffaloes, cempedak, rambai, and ramania.

The "Let's Finish It!" section contains activities carried out by students / student worksheets (LKPD) to achieve the learning objectives that have been mustered. This section contains aspects of scientific literacy, procedural and epistemic knowledge. In addition, it also contains aspects of science literacy in competence, namely explaining scientific phenomena, evaluating and designing research scientifically, and interpreting scientific data and evidence. According to Harahap (2020), the existence of student worksheets can improve students' science literacy skills. In the "Let's Finish Yuk!" section, it contains local wisdom such as containing typical animals of South Kalimantan such as hornbills, proboscis monkeys, alabio ducks, papuyu / bethok fish, swamp buffaloes, grouse. The "Let's Finish It!" section can be seen in Figure 5.

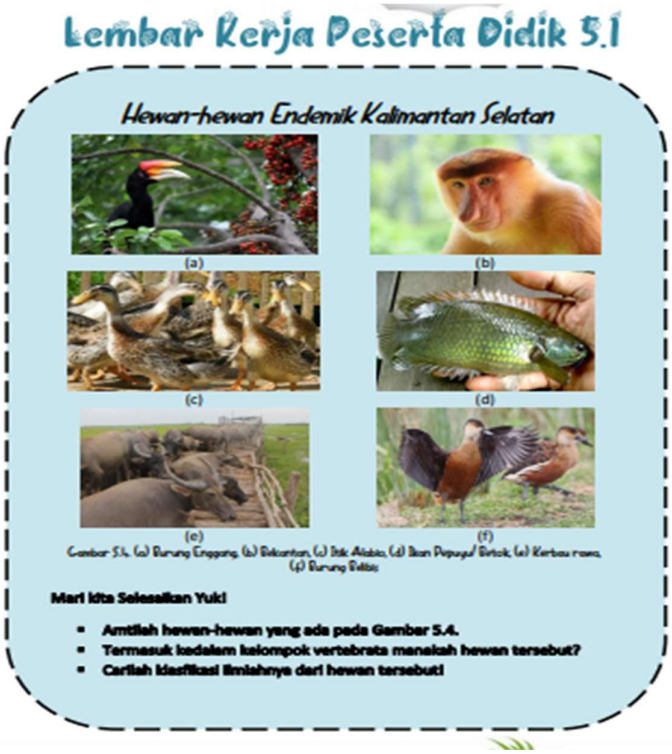

Figure 5. The "Let's finish it!" section

The "Info at a Glance" section contains additional information for students to know outside of the subject matter that has been presented. This section greatly adds insight to students beyond the material discussed. "Quick Info" can be seen in Figure 6.

Figure 6. Module info at a glance

The Summary section contains a summary of the material. This section aims to allow students to repeat the learning they have learned. The summary is presented concisely, clearly, and concisely.

"Knowledge Test Questions" section, this section is located at the end of each meeting. There are 10 questions at each meeting. This teaching material has 5 meetings, so there are 50 questions available. The questions presented are in the form of multiple choice. This "knowledge test question" is used as a useful evaluation to measure students' understanding of the learning that has been done. The results of the evaluation can provide professional decisions, individuals can evaluate both with quantitative and qualitative data (Asrul et al., 2015).

At the end of the teaching materials this module contains, answer keys, glossaries, and references. The answer key is provided so that the module teaching materials can be used independently by students. Glossaries are useful so that students do not have trouble interpreting difficult words. References are published to show that a piece of writing is not only made based on the author's own thoughts, but many from various sources.

The weakness of this research is that it has not reached all stages of the 4-D research model. This development research only reaches the stage of expert validation. There are still 2 more stages, namely development trials and Disseminate. The development trial stage is a module teaching material trial activity that has been designed on theactual subject recommendation, namely students (Thiagajaran, et al., 1974). The instrument needed at this stage is a student response questionnaire, the existence of a questionnaire is useful to find out how effective the use of teaching materials for the module being trialed. Input and recommendations at the development trial stage are used as improvement materials so that teaching material products obtain effective results.

After the development trial stage, the module teaching materials are disseminated. In this stage it is not the real purpose of the study. Therefore, this dissemination stage is directly in the form of disseminating teaching materials for classification of living things based on

scientific literacy and local wisdom either by e-book (electronic book) or in printed form to schools in South Kalimantan.

CONCLUSION

This development research resulted in teaching materials for the Science module Classification of Living Things based on Science Literacy and Local Wisdom thanks to a very valid validity score of 88.77. Consistency in assessment of teaching materials for classification of living things based on scientific literacy and local wisdom worth 63% with a fairly reliable category. The module developed has not yet reached the stage of student trials in the field and dissemination. The Science Module for the Classification of Living Things is expected to provide enlightenment and ideas in the development of teaching materials for modules based on science literacy and other local wisdom.

REFERENCES

Alfian, D. W., &; Sudarma, K. (2014). Improving Student Learning Outcomes through a Cooperative Learning Model of Student Team Achivement Division type in the Subject of Managing Class XI Office Administration Archive System at SMK Taman Siswa Kudus. Economic Education Analysis Journal, 3(1), 99–103. http://journal.unnes.ac.id/sju/index.php/eeaj

Arikunto, S. (2009). Research Procedure A Practice Approach. Rineka Cipta.

Asrul, Ananda, R., &; Rosnita. (2015). Learning Evaluation. Citapustaka Media.

Betari, M. E., Yanthi, N., &; Rostika, D. (2016). Improving Students' Science Literacy skills through the Application of Problem-Based Learning in Science Learning in Elementary Schools. UPI Anthology, 1–17.

Borg, W. R., & Gall, M. D. (1983). Educational Research: An Introduction, Fifth Edition. Longman.

Borich, G. D. (1994). Observation skill for effective teaching (Second). Macmillan Publishing Company.

Chiappetta, E. L., Sethna, G. H., & Fillman, D. A. (1991). A quantitative analysis of high school chemistry textbooks for scientific literacy themes and expository learning aids. Journal of Research in Science Teaching, 28(10), 939–951. https://doi.org/10.1002/tea.3660281005

Ernawati, I., &; Sukardiyono, T. (2017). Feasibility test of interactive learning media server administration subjects. Elinvo (Electronics, Informatics, and Vocational Educational), 2(2), 204–210.

Harahap, S. H. (2020). The Effectiveness of Science Literacy-Based Student Worksheets (LKPD) to Improve Science Literacy Skills in Human Digestive System Material. Bedelau: Journal of Education and Learning, 1(1), 82–88.

Hidayati Fitria, &; Julianto. (2018). Application of Science Literacy in Science Learning in Elementary Schools to Improve Students' Christian Thinking Skills in Solving Problems. National Seminar on Education, 180–184.

Jones, L. R., Wheeler, G., & Centurino, V. A. (2015). TIMSS 2015 science framework. TIMSS.

Kurnia, F., Zulherman, &; Fathurrohman, A. (2014). Analysis of Class XI High School Physics Teaching Materials in North Indralaya District Based on Science Literacy Category.

Journal of Physics Innovation and Learning, 1(1).
Majid, A. (2016). Learning Strategies. PT Remaja Rosda Karya.
OECD. (2013). PISA Framework 2015. OECD. http://www.oecd.org/pisa/pisaproduct/pisa2015/101092841.pdf
OECD. (2016). Assessment and Analytical Framework: Science, Reading, Mathematic, and Financial Literacy. OECD Publishing.
OECD. (2019). Result from PISA 2018 (Volume I-III). OECD.
Rahayu, S. (2014). Revitalizing the science approach in the 2013 curriculum to improve science literacy: Challenges and hopes. Proceedings of the National Seminar on Chemistry and Development.
Richey, R. C., & Klein, J. D. (2007). Design and Development Research: Methods, Strategies and Issues. Lawrence Erlbaum Associates, Publishers.
Setiawan, B., Innatesari, D. K., Sabtiawan, W. B., &; Sudarmin. (2017). The development of local wisdom-based natiral science module to improve science literation of students. Indonesian Journal of Science Education, 6(1), 49–54. https://doi.org/10.15294/jpii.v6i1.9595
Silalahi, A. (2017). Develpment research and research & development in the field of education / development. Dissertation Research Seminars & Workshops, 1–14.
Sumarti, S., Rahayu, Y. S., &; Madlazim, M. (2017). Development of guided inquiry-based learning tools to train students' science literacy. JPPS (Journal of Science Education Research), 5(1), 822–829. https://doi.org/10.26740/jpps.v5n1.p822-829
Thiagajaran, S., Semmel, D. S., &; Semmel, M. I. (1974). Instructional Development for Training Teacher of Exceptional Children. National Center for Improvement Educational System.
Tias, I. W. U. (2017). Application of the guided discovery model to improve science learning outcomes of elementary school students. Dwija Scholar: Journal of Pedagogic Research, 1(1), 50–60. https://doi.org/10.20961/jdc.v1i1.13060
Toharuddin, U. H., Hendrawati, S., &; Rustaman, A. (2011). Building students' science literacy. Humanities.
Trianto. (2007). Constructivist-Oriented Innovative Learning Models. Prestas Library.
Wilkinson, J. (1999). A Quantitive Analysis of Physics Textbooks for Scientific Literacy Themes. Research in Science Education, 29(3), 385–399.
Yuliati, Y. (2017). Science Literacy in Science Learning. Journal of Cakrawala Pendas, 3(2), 21–28. https://doi.org/10.31949/jcp.v3i2.592