



Development of Students Worksheet Learning Tools Made by Ethnoscience Based on Science Literacy

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Abstract: Research activities carry out measurements for science literacy ability contained in ethnoscience values by making electronic Student Work learning tools students worksheets that are useful for students. Ethnoscience is related to the concept of local culture contained in the electronic Student Worksheet learning tool students worksheet which is used as a source of learning and learning activities while science literacy skills will provide motivation and interest in learning in understanding learning materials and improving. Thus the realization of a research objective, namely to determine the feasibility test of material experts, media experts, and practicalization experts from learning tools for the development of students' worksheet learning tools to carry out ethnoscience based on science literacy on the material for the classification of living things at Muhammadiyah Langsa High School. The research method is a method of product development of students' worksheet learning devices. The results showed that products made and validated by material experts, media experts, and practicalization experts state that the products are suitable for sourcing learning media in learning and learning activities of students and teachers. This research can also be concluded that the overall average of expert assessments of students' worksheet product validation is feasible.

Keywords: Students Worksheet Learning Tools; Ethnoscience; Science Literacy

Introduction

Science literacy skills have not been achieved optimally applied in schools. This literacy ability is measured on internationally graded concepts through the Programme for International Student Assessment (PISA). The data obtained from the results of mapping data is found in TIMSS and PISA related to science literacy. Where Indonesia got a ranking of 40 consisting of 42 countries that joined the 2011 TIMSS mapping. Furthermore, in 64th place, it consists of 65 countries contained in the 2012 PISA mapping. It can be stated that the picture in the practice of the process of implementing science literacy is not optimal (Kemendikbud, 2017). In fact, the main target in the use of science literacy is students.

The concept of the scientific method is inseparable from the application of science literacy which will

improve the ability of students and interpret the process of science-based activities that can be used in everyday life, this is not only understanding from a learning theory will be able to solve problems that will occur in the learning process faced (Haryadi et al, 2015). The use of science literacy will be able to be used as an evaluation needed according to the conditions faced by students and can be used as a level of thinking ability (Mc Conney & Andrew, 2014). Science literacy will also provide and develop the ability of students' ability to implementukowati et al, 2017).

The implementation of science learning that will be given to these students is based on the formation of character possessed by students and self-efficacy (Kazempour, 2014). The use of this science literacy so that students in life are literate in concepts (Udompong et al, 2014). Learning science literacy can improve an outcome from the academics of students learning from

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science majors because it can connect a social issue that occurs in (Fayhaa & Al-Momani, 2016). Science literacy can increase the competence of students' competence in daily Kapueu, 2014).

The main target in the use of science literacy skills is to be educated to deal with problems in the future (Dayelma et al, 2019). Based on data on the achievement of student science literacy in PISA in 2018 which was attended by 78 countries, Indonesian students obtained an average score of 396 below the PISA average score of 500 (OECD, 2019). In accordance with the objectives of science literacy where the ability of students can increase in terms of thinking critically in receiving various information then correlated with the information that has been obtained in order to solve or find a problem (Prahastiwi, 2019). Problems faced in the process of learning activities.

Many problems occur in the process of learning activities in the world of education. This causes that learning in schools in Indonesia, in general, is still centered on teachers (teacher centers) and students are only listeners so the thinking skills (both critical thinking, creative, and other thinking) of students are not explored and differences in student abilities make it difficult to apply (Syehma, 2016). The implementation of the 2013 curriculum will be achieved, one of which is supported by the procurement of learning tools or resources used in the learning process as learning media (Vasmin et al., 2020). This is also supported by the statement that one of the factors causing the non-achievement of educational goals is the use of learning tools in the learning process (Al Mukarram et al, 2014).

The achievement of these activities was carried out research that strengthened science literacy skills using students' worksheet learning tools. learning tools can be designed and then developed as a need according to the conditions of students and can improve the quality of students' abilities (Nisa et al, 2015) There must be a change in innovation to develop students' worksheets as a learning tool by adding value from ethnoscience that can provide motivation and ask students to learn biology material.

The selection of student worksheets as a learning medium because, the media can be designed and developed according to the conditions and needs of students, in order to improve the quality of the learning process (Wardani et al, 2018) Thus, there is a need for innovation in learning media, namely by developing a learning process interesting student worksheets through the addition of local cultural elements (Ethnoscience) to foster students' interest and motivation in studying biology. Aspects of local culture in studying science are closely related to the daily life of students (Novitasari et al, 2017). The concept of science related to local wisdom or ethnoscience is part of the reconstruction as a

rearrangement or translation (Khusniati & Miratini, 2014).

Learning with an ethnoscience approach is based on the recognition of culture as a fundamental part of education. In addition, the ethnoscience approach also does not separate cultural science and the local wisdom of the community. This will increase the interest and motivation of students in science learning (Atmojo, 2017). The research conducted by Ariningtyas, et al (2017), namely applying a learning media in the form of student worksheets with ethnoscience content, turned out to be able to improve science literacy skills (aspects of context, content, and science processes) and improve learning outcomes and get a positive response by students. This is because, with the ethnoscience-charged learning media, students are invited to get to know the culture in the community where they live, so that students are more easily interested in learning biological sciences and broadly developing biological concepts in facing problems encountered in everyday life (Izzatunnisa et al, 2019). This shows that ethnoscience-charged learning has a good influence on learning outcomes and trains science literacy skills. then, in this case, media is needed as a learning tool, namely students' worksheets.

The development of students' worksheets as a learning medium that is carried out effectively can result in an increasing Competency-Based Curriculum for students (Sulistiyowati et al, 2018). The use of students' worksheets provides good responses for students in the learning process (Aristo & Tampubolon, 2019). Student worksheets are sheets containing tasks that must be done by students. according to another definition, a students worksheet is a printed teaching material in the form of material sheets, summaries, and guidelines in the implementation of learning tasks that must be completed by students and lead to basic competencies that must be achieved (Sartiah & D. Yulianti, 2015). Students' worksheet is part of the instructions in the form of sheets of teaching materials for students who are implementing of tasks in learning activities.

Students' Worksheet is a form of learning media while learning media is one of the learning tools, where the function of the student's worksheet is still not optimal so it is still unable to help students in finding concepts and stimulating their critical thinking skills. Learning tools, especially students worksheet, are needed as an alternative to bridging problems in learning (Rachman et al, 2017). The students' worksheet learning tool will be implemented using the material classification of living things. This material will later build students in knowledge and mastery of science literacy. The material for the classification of living things later and students are expected to be able to master the concept of the material and apply it to real life or daily life and make red lines between each other can

be mastered by students. Thus, the classification material of living beings has the potential to be science literacy-based learning because the material of growth and development is closely related to real life or is applicative (PISA, 2015).

Based on the results of the research team's interview with the Deputy to the School in the field of the curriculum at Muhammadiyah Langsa High School, it was said that during the learning process, students still did not master and could not relate the concept of material classification of living beings to the surrounding environment, which could be detected that students were still classified as low in their scientific literacy abilities. In addition, there is no science literacy-based student worksheet that supports learning Biology for the classification of living things and there is no student worksheet that trains one of the science literacy skills of students used in the learning process at SMA Muhammadiyah Langsa.

Thus, the purpose of the research was born to produce ethnosience-based student worksheet learning tools for improving scientific literacy skills validated from feasibility and practicality tests by developing students' worksheet learning device products on the classification material of living things at Muhammadiyah Langsa High School.

Method

The type of research used is development research (Research & Development or R & D). Research and development methods are research methods used to produce a particular product and test the effectiveness of that product. To be able to produce certain products, research that is a needs analysis is used, and to test the effectiveness of the product so that it can function in the wider community, research is needed to test the effectiveness of the product to be produced (Sugiono,

2017).

In this development research, the product developed is the Student Worksheet in Biology subjects in High School (SMA). This study aims to combine the electronic Student Worksheet conducting ethnosience based on Science Literacy in the sub-material classification of living beings as a tool or medium in the learning process of Biology. The resulting product is in the form of a Student Worksheet charged with ethnosience based on science literacy with the theme of classification of living things for class X SMA.

Furthermore, the students' worksheet product is carried out with feasibility tests from several experts on this validation sheet used to obtain information about the quality of learning media as a learning resource based on the assessment of expert validators. The validation sheets used are validation sheets for material experts, media experts, and practicalization experts. The information obtained through this instrument is used as input in revising the learning media that has been developed to produce a valid final product.

Result and Discussion

The results of the data process obtained in research activities regarding the development of ethnosience-based learning tools to improve science literacy skills on the classification of living things, which consists of several aspects of the research results as follows:

Ethnosience-based students worksheet validation is carried out by 3 validators, including 2 Biology Education lecturers and 1 Biology teacher. The components included in the validation aspect are the validity of the material expert, the validity of the media expert, and the validity of the practical expert. The recapitulation of the results of the students' worksheet validation stage is presented in Table 1.

Table 1. Validity of Material Experts

Assessed Aspects	Average %	Category
Content Quality		
Conformity of the material with KI /KD	100%	Very Valid
Conformity of the material to the indicators	100%	Very Valid
Conformity of the material to the learning objectives	80.0%	Valid
Conformity material with concepts or theories that apply in the field of science	80.0%	Valid
Average Content Eligibility Score	90.0%	Very Valid
Ethnosience		
The accuracy of the theme of ethnosience discourse with the sub-chapters of the material classification of living beings	100%	Very Valid
Completeness and accuracy of the content of the text of ethnosience discourse	100%	Very Valid
- Helping learners develop ideas/ideas of didik participants	100%	Very Valid
- Average Score Ethnosience Feasibility	100%	Very Valid
Science Literacy		
- Conformity of aspects of scientific knowledge with the content of students' worksheet	100%	Very Valid
- The conformity of aspects of science competence with the training questions in the students' worksheet	100%	Very Valid

Assessed Aspects	Average %	Category
Average Science Literacy Eligibility Score	100%	Very Valid
Presentation Quality		
- Font size and font format selection affect the readability of students.	100%	Very Valid
- There is a presentation attribute (owner's identity, foreword, table of contents, concept map, and bibliography)	80.0%	Very Valid
- The order of learning activities is arranged in a structured way	100%	Very Valid
- Citations provide a clear source	100%	Very Valid
Average Presentation Eligibility Score	95.0%	Very Valid
Linguistic Quality		
- The use of sentences in LKPD is in accordance with Indonesian language rules.	100%	Very Valid
- The language used is straightforward, easy for students to read and understand	100%	Very Valid
- Proper sentence structure	80.0%	Very Valid
- Understanding of the material presented	80.0%	Very Valid
Average Language Quality Eligibility Score	90.0%	Very Valid
Overall Average	95.0%	Very Valid

Based on Table 1 explains the development of students' worksheet products, ethnosience is carried out based on science literacy validation results obtained from material expert assessments which include aspects of content quality, ethnosience, science literacy, quality of presentation, and quality of language. In the validation process material experts obtained an overall average of 95.0% categorized as very valid with revisions according to suggestions and improvements for material design, it can be concluded that students' worksheet is suitable for use as a learning tool for students on the material classification of living beings. The results of this study are related to the statement that students'

worksheet is charged with Ethnosience which has been designed to be able to improve science literacy skills in aspects of content, context, and science processes as can be seen from the analysis of the results of the application of learning using students worksheet in the classroom, and received a positive response by students (Ariningtyas et al, 2017). The stages in students' worksheets are said to be feasible if they can develop aspects of systematic presentation that must be carried out by students to form basic abilities under the learning indicators that must be achieved (Daryanto & Dwicahyono, 2014). The results of such studies were found.

Table 2. Media Expert Validation

Assessed Aspects	Average %	Category
Students Worksheet size		
- Student's Worksheet size according to ISO standards	100%	Very Valid
- The size of the students' worksheets corresponds to the content of the student's worksheets	80.0%	Very Valid
- Average Eligibility Score Size students' worksheet	95.0%	Very Valid
Cover Design		
- Unsure appearance	100%	Very Valid
- Layout (title, author, illustration, logo, etc) balanced with the layout of the content.		
- Colors and elements clarify the function	80.0%	Valid
- The letters used are interesting and easy to read	100%	Very Valid
- Not using too many letter combinations	100%	Very Valid
- Cover illustrations can illustrate content/teaching materials	80.0%	Very Valid
Average Cover Design Feasibility Score	92.0%	Very Valid
Contents Illustration		
- Conformity of aspects of the science year with the contents of the students' worksheet	100%	Very Valid
- Conformity of aspects of science competence with the training questions in the students' worksheet	80.0%	Valid
Average Content Eligibility Score	90.0%	Very Valid
Content Illustration Design		
- Font size and font format selection affect the readability of students.	100%	Very Valid
- There are presentation attributes (owner identity, preface, table of contents, concept map, and bibliography)	80.0%	Very Valid
- The order of learning activities is arranged in a structured way	100%	Very Valid
- Citations provide a clear source	100%	Very Valid
Average Content Illustration Design Feasibility Score	95.0%	Very Valid
Overall Average	93.0%	Very Valid

Based on Table 2 explains the development of students' worksheet products, ethnosience is carried

out based on science literacy and validation obtained from media expert assessments which include aspects of the quality of size feasibility, cover design, illustrations content, and design illustrations contents. In the validation process material experts obtained an overall average of 93.0% categorized as very valid with revisions according to suggestions and improvements for experts, it can be concluded that students' worksheet is suitable

for use as a learning medium for learners on the material classification of living beings. Research result conducted by Asmiranti (2018) states that the content of students' worksheets has several elements, namely the title on the cover, instructions for use, basic competence or scope of the material, additional information to support the concept of the material, and tasks, questions or work steps.

Table 3. Expert Validation of Tactile Prak

Assessed Aspects	Average %	Category
Content Quality		
- The conformity of the material presented in the student's worksheet with KI and KD to be achieved	100%	Very Valid
- Conformity of the material presented in the student's worksheet with the indicators to be achieved	100%	Very Valid
- Conformity of the material with the prevailing concepts or theories in the field of science	80.0%	Valid
Average Content Eligibility Score	93.3%	Very Valid
Ethnoscience		
- The accuracy of the theme of ethnoscience discourse with the sub-chapters of the material classification of living beings	100%	Very Valid
- Completeness and accuracy of the content of the text of ethnoscience discourse	100%	Very Valid
- Helping learners develop learners ideas/ideas	100%	Very Valid
- Students' worksheet presenting a discourse that corresponds to the material of the classification of living beings	100%	Very Valid
- Students' worksheet presents discourses that can make students hypothesize	100%	Very Valid
Average Score Ethnoscience Feasibility	100%	Very Valid
Science Literacy		
- Conformity of aspects of scientific knowledge with the contents of students' worksheets	100%	Very Valid
- The compatibility of aspects of science competence with the practice questions in students' worksheets	100%	Very Valid
Average Science Literacy Eligibility Score	100%	Very Valid
Presentation Quality		
- Font size and font format selection affect the readability of students.	100%	Very Valid
- There is a presentation attribute (owner's identity, foreword, table of contents, concept map, and bibliography)	80.0%	Valid
- The order of learning activities is arranged in a structured way	100%	Very Valid
- Citations provide a clear source	100%	Very Valid
Average Presentation Eligibility Score	95.0%	Very Valid
Linguistic Quality		
- The use of sentences in students' worksheets is in accordance with Indonesian language rules.	100%	Very Valid
- The language used is straightforward, easy for students to read and understand	100%	Very Valid
- Proper sentence structure	80.0%	Very Valid
- Understanding of the material presented	80.0%	Very Valid
Average Language Eligibility Score	90.0%	Very Valid
Display Quality		
- Students worksheet has an attractive cover design	100%	Very Valid
- The appearance of the layout elements (title, author, illustration, logo, etc.) is balanced with the layout of the content.	100%	Very Valid
- The letters used are interesting and easy to read	100%	Very Valid
- The placement of layout elements (headings, subtitles, illustrations) in each chapter is consistent	100%	Very Valid
- The presented image is clear, attractive and the colors support the clarity of the material	100%	Very Valid
- The use of letter variations (bold, italic, all capital, small capital) is not excessive	100%	Very Valid
Average Presentation Eligibility Score	100%	Very Valid
Overall Average	96.3%	Very Valid

Based on table 3 explains the development of students' worksheet products, ethnoscience based on science literacy is the validation results obtained from

practicality expert assessments which include aspects of content quality, ethnoscience, science literacy, quality of presentation, quality of language, and appearance. In the

validation process by practicalization experts obtained an overall average of 96.3% was categorized as very valid with revisions according to suggestions and improvements for practicality experts, it can be concluded that students' worksheet is suitable for use as a source of learning media tools for learning and learning activities for students and teachers in the classification material of living beings. This is related to the results of the research conducted, it can be concluded that students' worksheet is worthy of use as a learning medium because it meets the eligibility requirements, namely very valid, very practical, and very effective based on the results of assessments from validators and student responses (Wardani & Mitarlis, 2018).

Conclusion

The implementation of students' worksheet product development to carry out ethnoscience based on science literacy is carried out to find out the feasibility test of students' worksheets consisting of material experts, media experts, and practicalization experts is In the validation process by material experts obtaining an overall average of 95.0% is categorized as very valid, In the validation process by material experts obtaining an overall average 93.0% were categorized as very valid and In the validation process by practicalization experts obtained an overall average of 96.3% categorized as very valid.

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