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# Development of Ethnoscience-Based Student Worksheet Using the Guided Inquiry Learning Model to Increase Students' Learning Motivation and Scientific Literacy: *A Review*

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**Abstract:** Education is a process of sharing knowledge, knowledge, value conversion, character formation with various supporting aspects with a specific aim in the plan to develop human potential. Currently, many students are unable to apply the results of chemistry learning in their daily lives, this can be triggered by inadequate selection of learning resources, resulting in low student motivation and scientific literacy. This requires a teacher's creativity in the learning process so that the quality of students' learning can increase. One way that can be done is to link learning materials with local culture which can later increase students' scientific knowledge and increase students' motivation and scientific literacy. This research aims to find out learning LKPD by applying ethnoscience learning to chemistry material. The method used in this research is a literature review. Based on the literature review that has been carried out, it can be concluded that selecting appropriate and ethnoscience-based learning resources ranging from 63.76 to 97.15 can improve students' scientific literacy abilities.

**Keywords:** Chemistry learning; Ethnoscience; Learning motivation; Scientific literacy

## Introduction

Education is a process of sharing knowledge, knowledge, value conversion, character formation with various supporting aspects with a specific aim in the plan to develop human potential (Nurkholis, 2013: Sari and Haryani, 2020). Education not only improves students' abilities in the knowledge aspect, but also has the ability to become agents of change, character and culture in facing future challenges.

However, the flow of globalization has actually shifted the original local cultural values of Indonesia, especially on the island of Lombok. Foreign cultural values that are developing so rapidly in people's lives have a broad impact on environmental balance. It is rare for teachers to be willing or able to integrate students' cultural traditions with the subjects they teach (including science) causing students to be unable to appreciate traditional forms of knowledge and wealth in their cultural communities. Formal education is seen as a learning process that is separate from the acculturation process and the context of the cultural community. Scientific literacy skills can be developed by using local community culture or ethnoscience as a learning resource (Innatesari, 2015: Siagian, *et al*. 2022).

In line with the function of education as a vehicle for preserving the nation's positive culture, prospective science teachers must be equipped with the ability to integrate local culture/native science in science learning. Original science is reflected in local wisdom as an understanding of nature and culture that develops among society. Local wisdom can be defined as the abilities (competencies) possessed by the people of Lombok which have been proven to be preserved to this day. These abilities can be in the form of knowledge,

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skills, attitudes and values that are operationalized in everyday life.

It can be seen in the research of Junita *et al.* (2020) that the achievement of students' scientific literacy indicators increased after learning using ethnoscience-based Student Worksheet. Overall achievement of scientific literacy indicators in the posttest was 85.8 % in the very good category. Thus, it is proven that ethnoscience-based student worksheet can facilitate increasing students' scientific literacy. Merta *et al.* (2020) said that ethnoscience learning includes constructivist learning so it is related to scientific literacy

Meanwhile, learning motivation is an urge that arises from within the student to learn in order to achieve the goals that have been set. The essence of learning motivation is internal and external encouragement for students who are studying to make changes in behavior, generally with several indicators or supporting elements. Motivation to learn can arise due to intrinsic factors, in the form of desire and desire to succeed and encouragement of the need to learn, hope for ideals, while extrinsic factors are the presence of awards, a conducive learning environment and interesting learning activities.

Learning motivation has a very important role in the learning process, with high motivation it can help students to achieve brilliant achievements in learning. Meanwhile, low learning motivation can hinder students from achieving satisfactory learning outcomes. Learning outcomes are a benchmark for the success of a learning process, through learning outcomes teachers can find out the extent of students' understanding of the learning that has been carried out.

Low student motivation to learn is influenced by many factors such as the teacher's teaching skills or learning facilities which are supporting facilities and infrastructure when teaching. Learning facilities have not been provided properly or the teacher's teaching methods are less than optimal in Teaching and Learning Activities which will cause students to be less motivated.

Natural knowledge or science is one of the subjects that plays an important role in education, this is because science can be a provision for students in facing various challenges in the global era. Therefore, learning methods are needed that can prepare students to have good competencies and be literate in science and technology, able to think logically, critically, creatively, argue correctly, and be able to communicate and collaborate. Scientific literacy can be termed scientific literacy skills, namely the ability to understand science, communicate science (orally and in writing), and apply scientific abilities to solve problems so as to have a high attitude and sensitivity towards oneself and one's environment in making decisions based on scientific considerations.

Based on the results of initial observations made by researchers at Arrahmaniah Islamic Middle School, the problem that occurs in the field is that students' learning motivation is still relatively low. The low motivation to learn can be seen from the lack of conduciveness to the learning process. This can be seen when the teaching and learning process is ongoing, there are still students going in and out of the classroom and there are some students making noise in the back seats. Students' curiosity is still relatively low when educators explain learning material, as a result, when they are given assignments, there are still students who are confused and end up cheating, some students even don't do the assignments.

Developing student worksheet by integrating cultural and scientific aspects, known as the ethnoscience approach, is a form of teaching material that has great potential to be developed in increasing students' learning motivation and scientific literacy. Using an ethnoscience approach can integrate character values in learning (Andayani *et al.* 2021), through education, especially in ethnoscience learning, it can have an influence on character building and development. Ethnoscience is an approach that connects the application of science in people's lives so that science and culture become connected to form the character of students. Therefore, ethnoscience has a direct and indirect influence on instilling and developing students' scientific attitudes. Developing ethnoscience student worksheet can also be an effort to introduce and preserve the culture around students.

The use of this guided inquiry model can achieve the goal of applying local cultural values that exist around students in science learning, such as instilling an attitude of honesty, responsibility and mutual respect which are characteristics of a scientific attitude. This aspect of guided inquiry can also influence students' curiosity and motivation and daily life through ethnoscience. So using the Inquiry model can increase student motivation.

Facts in the field based on surveys and observations show that the teaching materials used by science subject teachers only use school books sourced from the library which are used interchangeably with other classes. This is proven based on a survey of 26 students at Arrahmaniyah Islamic Middle School, around 70% of students do not have their own textbooks that can be used for science learning or study alone at home.

Based on survey results, 75% of students are familiar with the culture around them, but learning that integrates science material with the culture around students has never been taught in class. This is proven by the fact that as many as 70% of students have never received material related to the culture around them. Students who are familiar with the culture around them will be helped by the existence of student worksheet

teaching materials in understanding science material that connects the known culture with the material being studied.

The solution offered by researchers to the problems above is to develop teaching materials in the form of science worksheet that is integrated with culture using the Guided Inquiry model. The student worksheet developed will make it easier for students to understand science material so that it can increase students' learning motivation and scientific literacy because it is related to

## Method

The method used in this research is a descriptive method by reviewing several articles. Researchers conducted a study of research results related to the use of LKPD in chemistry learning which have been published in Indonesian language journals. This research data collection technique uses secondary data, namely relevant research articles. Researchers also limited articles to the last 5 years, namely 2019 to 2023

## Result and Discussion

Based on the results of analysis of research articles published in Indonesian language journals, the use of student worksheet in chemistry learning can be shown in Table 1. The results of the analysis in table 1 show that the use of student worksheet in chemistry learning can increase students' learning motivation and scientific literacy.

**Table 1.** Results of research on learning models, approaches, methods and/or strategies in increasing students' motivation and scientific literacy.

| Researcher | Article Title | Achievement |
|---|---|---|
| Siagian, *et al* 2022 | Development of Ethnoscience-Based e-LKPD to Train Scientific Literacy Skills on Food Substances | 96.60 |
| Pertiwi, *et al* 2021 | Development of Ethnoscience-Based Student Worksheets (LKPD) on the Concept of Electrolyte and Nonelectrolyte Solutions | 77.67 |
| Rohmaya, *et al* 2023 | Effectiveness of High School/MA Chemistry E-LKPD with a Problem-Based Learning Model Contexted with Social Science Issues in Increasing Students' Scientific Literacy | 75.00 |
| Wahyuni, *et al* 2020 | Using the Guided Inquiry Model with Simple Worksheets and Business Material: Impact of Motivation and Student Learning Outcomes | 71.00 |
| Novitasari, *et al* 2022 | *Argument Driven Inquiry* Learning Model to Improve Students' Science Literacy Skills | 85.04 |
| Ain, *et al* 2020 | Development of Guided Inquiry-Oriented LKPD to Increase Scientific Literacy in Material Factors that Influence Reaction Rates | 97.50 |
| Cholifah, *et al* | Development of E-LKPD *Guided Inquiry-liveworksheet* to Increase Scientific Literacy in Reaction Rate Factor Submaterials | 93.00 |
| Junita, *et al* 2022 | Development of E-LKPD Based on Ethnoscience to Practice Scientific Literacy Skills on Membrane Transport Material | 97.15 |
| Fitriyeni. 2023 | Development of Digital LKPD Based on Riau Malay Ethnoscience in Elementary School Science Content | 90.00 |
| Fialistyani, *et al* 2020 | Chemical Literacy in Competency Aspects Through Guided Inquiry Learning Using an Ethnoscience Approach | 77.71 |
| Agatha, *et al* 2021 | Validity of Ethnoscience-Based Student Worksheets on Mixed Separation Material to Improve Student Learning Outcomes | 88.75 |
| Wafiroh, *et al* 2020 | Theoretical Feasibility of Student Worksheets (LKPD) Based on the Guided Inquiry Model Human Reproductive System Material to Train Critical Thinking Abilities | 95.91 |
| Walidah, *et al* 2023 | Application of Ethnoscience-Based Student Worksheets to Improve Learning Outcomes at SMP Negeri 8 Banda Aceh | 89.58 |
| Sanova, *et al* 2021 | Ethnoscience Approach Using a Problem Based Learning Model on Chemical Literacy Ability in Buffer Solution Material | 76.40 |
| Kriswanti, *et al* 2020 | Development of Ethnoscience-Based Learning Tools to Train Elementary School Students' Scientific Literacy | 80.00 |
| Dawa, *et al* 2021 | Development of Guided Inquiry-Based LKPD on Digestive System Material at St. Catholic High School. Gabriel | 85.94 |
| Rasmiwetti, *et al* 2020 | Development of Student Activity Sheets (LKPD) Based on Scientific Literacy with Means-Ends Analysis (MEA) Strategy on the Subject of Acids and Bases | 90.67 |
| Fara, *et al* 2022 | Development of LKPD Based on Local Potential Integrated 21st Century Skills in Ecosystem Material Class X SMA Negeri 2 West Halmahera | 88.78 |
| Putri, *et al* 2021 | Effectiveness of LKPD to Improve Students' Scientific Literacy Skills in Chemistry Learning | 86.00 |

| Researcher | Article Title | Achievement |
|---|---|---|
| Nopriadi, *et al* 2022 | Analysis of Students' Scientific Literacy Through an Ethnopedagogical Approach to Chemistry Learning | 63.76 |
| Lubis *et al* 2021 | Development of an Ethnoscience-Based Science Learning Module on Global Warming Material to Train Junior High School Students' Science Literacy Skills | 88.00 |
| Fatima. 2020 | Feasibility Analysis of Android-Based Physics Learning Media using an Ethnoscience Approach as an Effort to Develop Students' Scientific Literacy Capabilities | 96.25 |
| Nilamsari. 2021 | Development of an Ethnoscience-Based Chemistry Reading Book on the Inuminang Tradition as a Source of Scientific Literacy | 96.67 |
| Indriyani, *et al* 2022 | Development of Practical Guide for Adsorption Isotherm Material Based on the *Indigofera Tinctoria L Plant* with a Guided Inquiry Approach | 89.00 |
| Pursitasari, *et al* 2019 | Development of Teaching Materials Containing Marine Contexts to Improve Students' Scientific Literacy | 81.90 |

## Conclusion

Based on the analysis of literature study methods that have been published in the article, it can be concluded that the LKPD developed for ethnoscience-based chemistry learning can make learning more meaningful, raise awareness and be responsible for preserving culture because culture can be more trusted by society if it is linked to scientific knowledge in a vulnerable way. values 63.76 to 97.15 are very suitable for use.

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