

# Concept Mastery of Ethnoscience-Based Integrated Science and Elementary Students' Life Skills Using Guided Inquiry

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**Abstract**---Based on these observations in several state elementary schools in Tegal City Center Java showed that the mastery of science concept at a level below the standard. Students' life skills also need to be improved to face the 21st century. This study aims to find the increasing in concepts mastery of ethnoscience-based integrated science, the development of elementary school students' life skills using guided inquiry learning and the correlation between the two variables. This experimental study used the design of one group pretest and posttest. Retrieval of data using observation techniques, written tests and documentation. The results showed that the increasing in concepts mastery of ethnoscience-based integrated science, the development of life skills significantly by using guided inquiry with  $r = 0.48$  (medium) and the positive correlation between concepts mastery of ethnoscience-based integrated science and students' life skills with  $r$  correlation = 0.55 (medium).

**Keywords:** *guided inquiry, integrated science concepts, ethnoscience, life skills*

## I. INTRODUCTION

The 21st century is an era where the development of technology is increasing and global competition is getting tighter. In this era, the information entered easily and quickly. On the positive side this is of course very good. Information that is quickly obtained makes someone know the development of the world. However, there is also a negative side. Foreign cultures that are not in accordance with the Indonesian people come in and damage national culture. One example of culture that is not in accordance with the Indonesian people is the rise of erotic dance with minimal clothing which is now rife with adolescents in Indonesia. This is not in accordance with the cultural character of Indonesia which upholds the norm of politeness. By having a polite culture, students are expected to be able to maintain national identity.

Politeness is part of life skills that must be instilled in students early on. Life skills are a person's ability to solve problems and maintain his life. Life skills are divided into two, namely generic life skills and specific life skills. Life skills that need to be developed for elementary students are generic

life skills that include personal skills and social skills. Personal skills include understanding oneself and thinking skills while social skills include the ability to communicate and cooperate with others. Students should realize and understand their potential so that they can maximize that potential. The ability to find information, process it, and draw final conclusions needed to solve existing problems. Working together and communicating are important foundations because the use of technology erodes this social relationship. Students should be able to express their opinions in front of the class in the form of presentations or in small group discussions [1]. Here students must learn to work with other students. He must accept or listen to other people's suggestions, help friends who have difficulty or complete tasks in groups.

Life skills learning can be applied to all subjects including sciences. At present elementary school science learning at this time is integrated science learning. Integrated Science Learning is an approach to learn that intentionally links several aspects in intra-subjects or between subjects [2]. By using Integrated Science learning, students find it easier to master learning material because learning is distinguished on themes. Some subjects are taught in the same theme. The theme taught must be appropriate or close to the student's life. Teachers should be able to associate learning with the environment around students as a source of learning so that learning is more interesting and not boring. Learning using the surrounding environment can make students have better social skills and can foster a sense of love for local or regional culture [3]. Therefore learning using local culture should have been applied early on from elementary school to foster a love of regional culture. Learning using local or local culture applied to science learning or science is called ethnoscience. Ethnoscience based science learning that links learning with community culture will increase students' appreciation of the culture of the community [4]. Regional culture is the wealth of a nation that will enrich national culture. With ethnoscience, students can understand the

science concepts and improve students' cognitive abilities and critical thinking 's research [5].

To get the best result from this ethnosience-based learning, the right model is needed. Many learning models with their own strengths and weaknesses can be used by the teacher. One learning model that can be used is inquiry. The inquiry learning model is a series of learning activities that involve maximally all students' abilities to search and investigate systematically, critically, logically, analytically, so that they can formulate their own findings confidently [2], [6]. This guided inquiry learning model is in harmony with science learning in elementary schools because it uses scientific methods that make students think scientifically. Guided inquiry learning models will foster the ability to think scientifically so students will find something with their own experience. This learning model facilitates students to design and provide answers to questions or questions asked by the teacher. Guided inquiry will also train students' ability to communicate their findings, so that this model can help students understand the concept of science. Guided inquiry can improve learning outcomes, science process skills and scientific attitudes of students [7], [8].

**II. METHOD**

The type of this research is quasi-experimental using the design of one group pre-posttest. The sample in this study were grade 4 students totaling 66 elementary school students consisting of two public elementary schools in Tegal Regency Central Java in the 2018/2019 Academic Year. Data collection techniques used in this study were test and non-test techniques. The test technique uses pre-test and post-test while the non-test uses observation. Pretest and posttest were used to measure mastery of integrated science concepts based on ethnosains, while life skill observation was used to measure the development of students' life skills. A visit to the tea factory was carried out so that students could see the process of tea making directly as part of the ethnosience learning. Based on the validity test, of the 40 questions tested, 27 valid questions were obtained. Finally, 25 questions were selected as pretest as well as posttest to measure the mastery of the integrated science concept based on ethnosains. After the normality test is carried out, the results of the data are not normally distributed so that the data analysis uses a nonparametric test. Data analysis techniques used Wilcoxon Test, N-gain and Spearman Correlation Test.

**III. RESULTS AND DISCUSSION**

**3.1. Concept mastery of ethnosience-based integrated science and student life skills**

Concepts mastery of ethnosience-based integrated science can be seen from the differences

in results before and after the inquiry method is applied in learning. To see the results of mastery of the integrated concept of ethnics-based science, it is necessary to look at the differences in concepts mastery of ethnosience-based integrated science and their improvement. To see the differences in the results of mastery of the integrated science of concepts mastery of ethnosience-based integrated science using the Wilcoxon Test with results that can be seen in Table 1.

**Table 1.** Wilcoxon Test Results

		N	Mean rank	Sum of ranks
Pre-posttest	Negative Ranks	0 <sup>a</sup>	,00	,00
	Positive Ranks	64 <sup>b</sup>	32,50	2080,00
	Ties	2 <sup>c</sup>		
	Total	66		

- a. posstest < pretest
- b. posstest > pretest
- c. posstest = pretest

From Table 1 there is an explanation that there is no decline in value. All students experience an increase in grades. Sixty six students who participated in the pretest and posttest there were 64 students who experienced an increase. Whereas there are 2 students who have the same value. With an average yield of 32.50 it shows that there is a significant difference between pretest and posttest. This difference can occur due to various factors including student background. Student background includes family economic conditions and student intelligence. The economic situation of students is influenced by the work of parents. Based on the observation of documentation, it is known that the work of parents is mostly as farmers, traders, civil servants and private employees.

The Increase of concepts mastery of ethnosience-based integrated science can be seen using N-gain. The results of the N-gain analysis on the mastery of the integrated science concept based on ethnics can be seen from Table 2.

**Table 2.** Level of concepts mastery of the ethnosience-based integrated science in Students Before and After Treatment

	Before treatment	After treatment	Ngain	Descrip-tion
Lowest score	28	58		
Highest score	80	96	0.55	medium
Total	3.716	5.310		
Average	56.30	80.45		

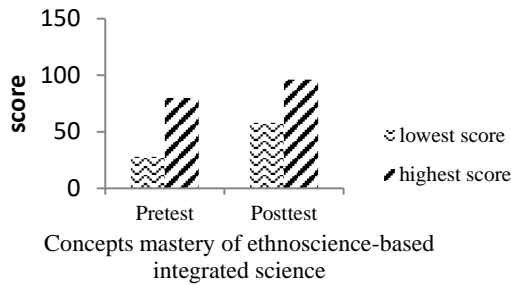


Figure 1. Analysis of the results of concepts mastery of ethno-science-based integrated science before and after treatment

Based on the distribution of N-gain scores obtained per student, 16 students were in high criteria, 41 students were in medium criteria and 9 students were in poor criteria. This proves that increasing the mastery of the ethno-science based integrated science concept is in the medium category. Almost all of the students get better score in post test which means guided inquiry can improve the students science concept.

After seeing the result of mastery concept, the researchers look at the students life skills. Researcher observed the students activity in the teaching learning process. The results of the analysis of life skills development can be seen in Table 3.

Table 3. Average of Student Life Skills Scores in Meetings 1, 2 and 3

Indikator	Meeting 1	Meeting 2	Meeting 3	Total	Average	Description
Discipline	60	63	79	202	67	Adequate
Politeness	40	59	66	166	55	Adequate
Independence	33	52	60	145	48	Poor
Responsibility	40	57	70	167	56	Adequate
Confidence	44	63	78	185	62	Adequate
Total	218	294	865	865	459	
Average	44	59	71	173	58	

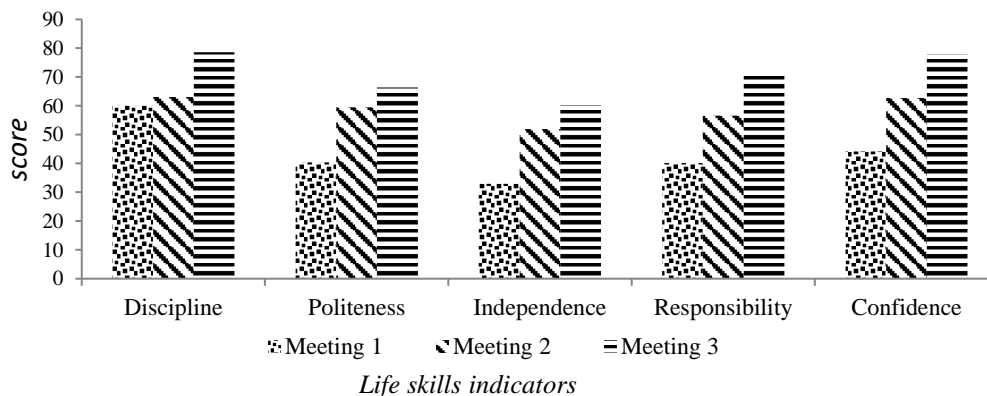


Figure 2. Graph of life skills development

From Table 3 above the development of life skills shows sufficient results. Four of the five life skills indicators observed sufficient results, while one life skills indicator was still in the poor category. Even though it is still in the less category, significant development continues from the first, second and third meetings. The development of students' life skills can also be seen from the increase in each meeting. The following is an increase in the value of <g> based on meetings 1, 2 and meeting 3 showed in Table 4.

From Table 4, there is an increase in the value of < Dg> = 0, 21. This increase occurs because students are already getting used to the inquiry learning model. Students begin to understand how to deal with the problems posed by the teacher,

how to work with group friends and how to report the results of the discussion in front of the class.

Table 4. Increasing the value of <g> at Meetings 1, 2 and 3

	<g>	Percent age (%)	Desripti on
Meeting 1 and 2 <g1>	0,27	35	Poor
Meeting 1 and 3 <g2>	0,48	62	Mediu m

Mastery of concepts as cognitive aspects is expected to be optimized by students. Inquiry-based learning has a positive impact on understanding concepts. The inquiry learning phase where students

must be actively involved in asking questions, looking for answers and making conclusions makes students understand the concept better than just listening to the teacher's explanation [6]. This is in line with the results of the research which showed that the results of the analysis of the increase in the score of the results of the concept mastery test were high after using the inquiry model [6], [9]. This shows that this model is very effective in improving students' mastery of concepts. The increase in mastery of the concept of each ability group in the inquiry learning model is greater than the increase in mastery in the conventional learning model. Inquiry-based activities can also increase student motivation. This is because this learning model provides freedom in making choices, giving an opportunity to carry out self-regulation and take part in learning process [7], [10].

Confidence makes student learning outcomes increase. Confidence also makes collaboration and cooperation skills increase. Collaboration can be established well if each individual knows his job and does his best [4]. Subasree and Nair states that cooperation will foster an attitude of empathy towards fellow students, increasing caring behavior towards those who need help and accepting and understanding differences [11]. Collaboration can also help students solve problems and improve social relations well [12]. This is in accordance with the results of Veloo's research which states that students' attitudes towards science learning or science increase after using inquiry learning [13]. The developing attitude of science is curiosity, discipline, independence and self-confidence. The use of guided inquiry learning models in the classroom makes students develop a sense of responsibility, independence, and confidence [10]. Ethno-science based science learning that links learning with community culture will increase students' appreciation of the culture of the community.

**3. 2. Correlation between concepts mastery of the ethnosience-based integrated science and students' life skills**

Correlation aims to find the effect of students' life skills on concepts mastery. The correlation test in this study was carried out on the results of the posttest (the results of concepts mastery) on learning and observations of students' life skills. Based on the results of the analysis on the data normality test using SPSS with the Spearman analytical method, a significance value of  $p = 0.00$  was obtained with  $sig. < 0.05$ , which means that the data is abnormally distributed. Then it can be concluded that the prerequisite test for the parametric test is not fulfilled, so the researcher moves to the non-parametric statistical test, namely by using the Spearman correlation test. The correlation test results can be seen in Table 5.

**Table 5.** Spearman Correlation Test

		Concept mastery	Life skills
Spearman's rho	Correlation	1.000	.750**
	Coefficient	.	.000
	Sig. (2-tailed)	.66	.66
	N		
Spearman's rho	Correlation	.750**	1.000
	Coefficient	.000	.
	Sig. (2-tailed)	.66	.66
	N		

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Based on table 5 above, it is known that the significance value or sig (2-tailed) is 0.00. Because the sig (2-tailed) value is  $0.00 < 0.05$ , it means that there is a positive relationship between concepts mastery of ethnosience-based integrated science and student life skills. From the table, the correlation coefficient number is 0.750. This number means that the strength of the correlation relationship between mastering the concept and life skills is very strong. The number of correlation coefficients on these variables is positive, so the relationship between the two variables is unidirectional, thus it can be interpreted that if life skills are increasingly improved, mastery of concepts will also increase.

This is evidenced by Subasree's research (2015) stating that increasing mastery of concepts will be followed by an increase in students' life skills [11]. When curiosity increases, students will work together to get the desired answer. Because getting the desired answer independently, students will save the memory for longer. This independence will also change teaching orientation. Teaching that was once a teacher center can be shifted into a student center. The teacher can act as a facilitator to ensure that the concepts obtained by students are correct [14]. Subali et al. (2017) explains that increasing students 'ability to ask questions, express opinions or think critically will improve students' mastery of concepts. When a student knows something, he will share that knowledge with his friend [15]. By looking directly, even directly touching the tea leaves being dried makes students better understand the material being taught.

Students obey the rules set by the officer. By knowing the rules that must be done before the visit, students can maintain their attitude during the visit. The number of researchs states that knowing the rules that must be followed from the beginning makes a person maintain his attitude to comply with the established rules [8], [14]. By obeying the rules, students concentrate more on receiving the information provided. Jeenthong et al. (2014) states that character value-oriented learning will improve mastery of the science concept [16]. The character in question is disciplined, independent and polite. This increase in character values will make students

active in learning. Students are not just memorizing lessons, but discovering the concepts being taught themselves [15], [16].

#### IV. CONCLUSION

Based on the results of the research and discussion it can be concluded that there is an increase in mastery of the integrated science concept based on ethno-science and significant student life skills. Another conclusion obtained is that there is a positive and strong relationship between mastering the integrated science concept based on ethnosience and student life skills. Improving the concepts mastery of ethnosience-based integrated science will improve students' life skills. Vice versa, improving life skills will improve the concepts mastery of ethnosience-based integrated science.

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