



## Analysis of Science Skill Process in Application of Integrated Ethnoscience Inquiry Model for 4th Grade Students of SD Inpres Tadat

Maria Herliyani Dua Bunga<sup>1\*</sup>, Maria Fransiska Yuniati<sup>2</sup>, Genoveva Lise Dua Kowe<sup>3</sup>

Program Studi Pendidikan Guru Sekolah Dasar, Universitas Nusa Nipa  
e-mail: [anionachawhisandy@gmail.com](mailto:anionachawhisandy@gmail.com)

### Abstrak

Tujuan penelitian adalah untuk mengetahui pengaruh penerapan *ethnosains* dan mengetahui keterampilan proses sains siswa kelas 4 SD Inpres Tadat. Penelitian ini menggunakan metode penelitian campuran (*mixed methods*) dengan pendekatan *Convergent Parallel Design*. Pengambilan sampel dilakukan dengan metode *non-probability sampling*. Berdasarkan hasil uji-t diperoleh *thitung* adalah 6,460 dan *ttabel* pada taraf signifikansi 5% dengan derajat kebebasan ( $dk$ )=8 adalah 2,306. Berdasarkan kriteria uji *thitung > tabel* ( $6,460 > 2,306$ ) maka ada pengaruh variabel X terhadap variabel Y.  $H_a$  diterima dan  $H_o$  ditolak, artinya ada penerapan *ethnosains* berbantuan model pembelajaran inkuiri sains pada proses keterampilan terhadap siswa kelas 4 SD Inpres Tadat. Dengan perhitungan N-gain mengalami peningkatan yang signifikan sebesar 70% dengan kategori sedang-kategori tertinggi.

**Kata Kunci:** *Ethnosains, Proses Keterampilan Sains, Inkuiri, Gerabah Wolokoli.*

### Abstract

The objectives of the study is to know the effect of the ethnoscience application and to know the students' science skill process in the 4th grade students of SD Inpres Tadat. This research uses blended research methods (mixed methods) with The Convergent Parallel Design approach. Sampling was done by non-probability sampling method. Based on the results of the t-test, it's obtained that *thitung* is 6.460 and *ttabel* at a significance level of 5% with degrees of freedom ( $dk$ )=8 is 2.306. Based on the test criteria *thitung > tabel* ( $6,460 > 2,306$ ) then there is an effect of variable X on variable Y.  $H_a$  is accepted and  $H_o$  is rejected, it means that there is ethnoscience applying assisted by inquiry learning model on science skill process to the 4th grade students of SD Inpres Tadat. By the N-gain calculation has a significant increase of 70% with the medium category-highest category.

**Keywords:** *Ethnoscience, Science Skill Process, Inquiry, Wolokoli pottery.*

### INTRODUCTION

Learning science is learning that uses the steps of the scientific method. Science learning focus on skill process. According to Lindrawati & Rohandi (2015) in learning science, the aspects of scientific are integrated in the skill process approach and scientific method. The scientific approach in the learning science process can be applied through science skill process.

Science skill process is a learning approach designed to the students are able to find facts, build concepts, and theories in the learning received. These skills are needed to acquire, develop and apply concepts, legal principles, and scientific theories (Amnie, et al, 2015). Science process skills are very important for students as a preparation and exercise in dealing with the realities of life in society because students are trained to think logically in solving a problem. Therefore, science process skills need to be developed in learning science

Curriculum 2013 supports learning by empowering the culture. The curriculum must be responsive to the development of science, culture, technology, and art that can build the curiosity of students, through education students can recognize, understand, learn and develop cultural values, especially the culture of the community in the student's environment. Culture gives us the ability to maintain knowledge and transmit the culture we learn to other generations through certain ways (Liliweri, 2014).

The learning science process in schools, teachers are expected to be able to relate teaching materials to local culture. Sudarminet al. (2015) stated that scientific approach for education in Indonesia is Science, namely original knowledge in the form of language, customs and culture, and morals. Joseph (2010) suggests that the ethnoscience approach is based on the recognition of culture as part of education as an expression and communication of an idea. In their daily life, students always interact with the local cultural environment related to a scientific concept.

Local culture in Wolokolinese is clay craft "Tutu Unu" which is a craft as well as an activity and is used as a livelihood. With clay to produce jugs for cooking wine which in the local language is called unu tua, and pots. Through the activity of making clay crafts, students can saw the science material that has been taught. Science material related to clay crafts is muscle force and its effect on the objects.

Ethnoscience-based learning that does not separate cultural science and local wisdom as well as the community can be used as a learning approach to increase students' interest and motivation towards science (Rahayu, W. E. & Sudarmin, S. 2015). Ethnoscience-based learning is able to realize the process of developing the quality of students' self as a generation of the nation's growth and development. Integrated learning shows that students are interested and enjoy the learning process because it is interspersed with knowledge of local wisdom, for example making a product in an area (Nisa et al, 2015). Using an ethnoscience approach, it is given to students as an effort to optimize contextual integrated learning and strengthen the environment as learning resources. Learners are able to connect the learning materials studied with the context of everyday life.

Based on interviews at one of the Primary School at Bola Subdistrict, namely SD Inpres Tadat, the learning process still applies conventional learning. In the learning process, the results of students' science skill process are still not optimal. It can be seen from the learning outcomes of students who have not reached the Minimum Criteria of Mastery Learning (KKM), which is 60. Low student learning outcomes can be caused by the lack of students' science skill

process and the application of learning models that do not involve students actively in learning process.

In training to develop students' science skill process, teachers need to apply learning models that can make students more active. The inquiry model according to Sanjaya (2016) is a series of learning activities carried out on critical and analytical thinking processes to find and find answers to a question in question through investigation. According to W. Gellu (in Damayanti, 2014) which defines inquiry as a series of learning that involves maximally all students' abilities to search and find out systematically, critically, logically, and analytically so that they can formulate their own findings with confidence.

The results of previous research proved the success of the application of the inquiry learning model, including Dewi, et al. (2017) stated that learning with the inquiry model improved students' science skill process and students' science process skills increased for each indicator. Fitriani and Supardi (2020) state that the inquiry learning model can improve students' science process skills by increasing the N-gain test is medium, and the application of the inquiry learning model to improve science skill process gets a good response.

## **METHODOLOGY**

This type of research is a blended research (mixed method) with The Convergent Parallel Design approach (Sugiyono, 2015). The research conducted at SD Inpres Tadat. The samples in this research were all of the 4<sup>th</sup> grade students at SD Inpres Tadat. This research required two data, namely quantitative and qualitative data, the data collection process was conducted in two the phase simultaneously.

Quantitative research method was applying ethnoscience in the form of an inquiry model to science skill process in elementary school students. In this research, using of pre-experimental design one group pretest-posttest design. Taking Sample was carried out using the non-probability sampling method (Sugiyono, 2015). Quantitative data is a test of student learning outcomes. Qualitative research methods, was students' science skill process in the application of ethnoscience assisted by the inquiry learning model. Qualitative data were observations and interviews. In this research, using by triangulation techniques.

The data collection techniques in this research were observation, tests, interviews, and documentation. Data analysis techniques used in this study are as follows:

1. Validity Test and Reliability Instrument

To show the level of reliability or validity of a measuring instrument and to know determine the consistency of the data findings.

2. The activity of the Student in science process skills

To describe the activities of the students in science process skills on applying ethnoscience assisted by the inquiry learning model.

3. Normality test

Conducted on two kinds of data, were pretest and posttest value data. And to findout whether the residual value data is normally distributed or not.

#### 4. t test

To prove whether or not there was a significant effect on the implementation of learning by applying ethnoscience assisted by the inquiry learning model on science skills process from learning outcomes, and distinguish in student learning outcomes at the pretest and posttest.

#### 5. Test N-gain

To find out the application of ethnoscience learning assisted by the inquiry model to students' science skill process using the N-gain, which is calculated in the n-gain calculation is the pretest value and the posttest value.

Tabel 1. Science process skills in primary school students

No	Ability	Skill Developed
1	Observation	Observing an event that occurs by using sensory perception owned
2	Classifying	Finding or showing the similarities, differences and relationships
3	Prediction	Making assumption what will happen when conduct an experiment or observations.
4	Interpretation	Interpret and conclude what has been founded
5	Communicating	Communicating the result of the activities that have been done.

Source: Ulfa (2015)

Learning process by using inquiry learning model in the ethnoscience application are:

##### 1. Student oriented to the problem

The teacher's efforts to focus on the students' attention on making pottery to be observed and collecting facts after make observation activities

##### 2. Formulate the problem

The teacher helps students to formulate the problems and records every observation of making pottery.

##### 3. Formulate the hypothesis

The teacher guide the students to make hypotheses of the problems that have been proposed.

##### 4. Collecting the Data

The teacher encourages the students to collect a fact information and required the data.

##### 5. Testing the hypothesis

The teacher helps the students conduct group discussions and observations the problem to ensure an answer as a solution of the problem.

##### 6. Formulate the conclusion

The teacher helps students to reflect and evaluate the results of observations of making pottery from clay.

## RESULT AND DISCUSSION

This research was conducted at SD Inpres Tadat for the 4<sup>th</sup> grade students totally of the 10 students. Before conducting the research, the first is and make validate the instrument to the validator. Based on the result of the instrument validity of the manual calculation has quite high and medium validity. The

processing of reliability test data using the Alpha Cronbach formula assisted by SPSS that the Cronbach Alpha value of each instrument has a range of values above 0.9 and the instrument in this study is reliable.

The data of student Science skill Process, it can be seen from the percentage of science process skills achievement was grouped into three categories, namely low (<30%), medium (30-60%) and high (>60%). (Rusman in Jufri 2017:109). The results of the calculation of the percentage of classical science processes can be seen in table 2.

Table 2. The percentage of classical Science Skill Process

SKP Aspect	Total Ideal Score	Total Score Average	Average score	Percentage	Category
Observing	120	82	8,2	68%	High
Clarification	40	24	2,4	60%	Medium
Prediction	40	29	29	72%	High
Interpretation	80	53	5.3	66%	High
Communication	120	83	8,3	69%	High

Based on the results of observations science skill process, the average value of the percentage is high, with each obtaining an average value of a high percentage with a percentage above 60%. From the five aspects of the skills, science skill process in classifying are categorized as medium, because of classically the percentage obtained is 60%. The Student worksheets make aspects of science skill process. The following is the data obtained from observations during the learning process can be seen in table 3 below:

Table 3. Student Worksheet Analysis

SKP Aspect	Group			Total	%
	1	2	3		
Observing	100	100	100	300	100%
Classify	100	100	90	290	97%
Predict	85	90	85	260	87%
Interpret	90	95	85	270	90%
Communicating	100	100	100	300	100%
<b>Total</b>	<b>475</b>	<b>485</b>	<b>460</b>	<b>1.420</b>	<b>95%</b>
<b>Averagae</b>	<b>95</b>	<b>97</b>	<b>92</b>		

Source: Results of research data analysis

Based on the table 2 above, it can be seen that the results of the Worksheet Students analysis in groups of the students are very capable in observing and communicating aspects, while the aspects of classifying, predicting, interpreting in groups of students are in the good category. The students responses to learning in the ethnosience application assisted by the inquiry learning model, indicate that there was positive responses. By applying ethnosience assisted by the inquiry learning model, students are actively entangled in contextually learning linking the material being studied with the process of making cooking pot, students' activities learning become more meaningful and understand better the subject matter received. In the

learning process students need to be accustomed to solving problems, finding their own ideas and knowledge gained.

Discussion activities and assessment of science skill process, can develop students' thinking, skills and enthusiasm for learning process. Science skill process consist of observing, classifying, predicting, interpreting, and communicating. This activity, students become braver to ask questions, answer questions, issue ideas/opinions, and others.

The hypothesis in the research being tested is the alternative hypothesis (Ha) is accepted and the null hypothesis (Ho) is rejected. Hypothesis testing in research is to prove whether there is a significant effect on the implementation of learning by applying ethnoscience assisted by inquiry learning model on science skill process from learning outcomes, and then differences student learning outcomes on the pretest and posttest. The calculation results show the average value of learning outcomes in the application of ethnoscience to the students' science skill process with an average pretest score of 47 and posttest 71. From these data it is known that the posttest average value is greater after applying ethnoscience assisted inquiry learning model to science process skills.

Data analysis using the t test, the Kolmogorov-Smirnov normality test was first carried out to determine whether the residual value data was normally distributed or not, provided that the significance value  $> \alpha 0.05$ , then the residual value was normally distributed. The results of the Kolmogorov-Smirnov normality test are known to be sig. (2-tailed) 0.924 and significant level = 0.05. It was concluded that the significance value of  $> \alpha 0.05$  ( $0.924 > 0.05$ ) the residual value was normally distributed.

Based on the normality test of Kolmogorov-Smirnov concerning test on the pretest and posttest value data, it is known that the distribution is normal. Thus the hypothesis test can be done using the t test. The test criteria are significant values  $< 0.05$  or  $t_{hitung} > t_{tabel}$ , so there is an effect of variable X on variable Y. Ha is accepted and Ho is rejected. With  $dk = n - 2$  and a significant level of 5% ( $\alpha = 0.05$ ). Ha stated that there was effect of applying ethnoscience assisted by the inquiry learning model to the 4<sup>th</sup> grade science skill process of Primary Schools of Tadat and Ho stated that there was no effect of applying ethnoscience assisted by the inquiry learning model to the fourth grade science skill process of SD Inpres Tadat. From the results of the analysis the hypothesis testing have been done, can be presented in table 4 below:

Table 4. Results of the analysis of the t hypothesis testing

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	23.223	7.595		3.058	.016
Inquiry terintegrasi etnosains	1.017	.157	.916	6.460	.000

Source: result of the data analysis by using SPSS 16 research

From the result of the t-test analysis above show that the value of sig grade. (2 –tailed) is 0,000 whereas significant level =0,05. And  $t_{hitung}$  is 6,460 and  $t_{tabel}$  with  $dk=8$  and the significance level=0,05 is 2.306. So it can be conclude if the significance value  $<0.05$  or  $t_{hitung}$ , so there is an effect of X variable on the Y variable. The alternative hypothesis ( $H_a$ ) is accepted and the null hypothesis ( $H_0$ ) is rejected. Therefore, it can be concluded that the significant value is  $< 0.05$  or  $t_{hitung} > t$  tabel ( $0.000 < 0.05$  or  $6.460 > 2.306$ ).  $H_a$  is accepted, which means that there is an effect of ethnosience applying assisted by the inquiry learning model to the 4<sup>th</sup> grade science skill process of SD Inpres Tadat.

The application of ethnosience learning assisted by the inquiry model on students' science skill process using N-gain. In the calculation of N-gain is the pretest value and posttest value. The following calculation of N-gain can be seen in table 5 bellow:

**Table 5.** Total N-Gain Test Score

No.	Pretest	Posttest	N-gain Skor	Criteria
1	70	90	0,67	Medium
2	40	70	0,5	Medium
3	40	60	0,33	Medium
4	50	80	0,6	Medium
5	50	70	0,4	Medium
6	40	60	0,33	Medium
7	30	50	0,29	Low
8	40	70	0,5	Medium
9	50	70	0,4	Medium
10	60	90	0,75	Height
%TT	80%	10%	10%	
%T	20%	90%	90%	
Increasing	70%			

Source: The result of data analysis research

Based on the table above, it can be seen that the n-gain of the students in posttest learning process has increased significantly. The table above shows that from 10 students, 1 student with a percentage (10%) did not has a significant increase, while 90% of students with a total of 9 peoples has a significant increase in the medium and high category.

## CONCLUSION

Based on the results of the research and the overall discussion that has been explained before, it can be concluded that to describe the ethnosience application assisted by the *inquiry* learning model to science skill process for 4<sup>th</sup> grade students of SD Inpres Tadat, it can be seen through the observation, learning outcomes tests and interviews. The results of the calculation of the hypothesis t test also indicate the acceptance of the alternative hypothesis ( $H_a$ ), the sound of the alternative hypothesis ( $H_a$ ) is that there is an effect of the ethnosience application assisted by the inquiry learning model on the science skill process of 4<sup>th</sup> grade student of SD Inpres Tadat. And the result of interview obtained indicate that by ethnosience application assisted by learning models involving students in the

process of learning science skills that students by acquiring, applying and developing can increase understanding of science concept .

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