

## The Analysis of Students' Concept Comprehension Ability on the Application of CLIS Learning Models Integrated Ethnoscience

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### Abstract

This study aims to analyze the improvement of students' concept comprehension ability by applying CLIS (Children Learning In Science) learning models integrated ethnoscience. This study employed a quasi experimental method with one group pretest-posttest design. The data used include pretest and posttest score. The data were analyzed using the one-sample test for the average test, proportion test (Z test) to calculate the classical completeness and N-gain calculation. The result revealed that students who fulfill the minimum standard criteria (KKM) were 30 students with the classical completeness 93.75%. The proportion completeness of concept comprehension ability passed over 75%. The improvement of concept comprehension ability was 0.4 and categorized as medium. Each indicators of concept comprehension increased sequentially that is translating 86.3%, exemplifying 91%, classifying 77.5%, summarizing 76.3%, predicting 88.8% and explaining 73.8%. The improvement of indicator concept comprehension generally in the very good category. Based on the result obtained, it can be concluded that the application of CLIS learning models integrated ethnoscience can improve students' concept comprehension.

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## INTRODUCTION

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

*Tu tua* is an activity to make *tuak* or *moke* (local wine) which has become the culture of the Umauta village community and inherited from generation to generation. *Moke* or *tuak* made from *nira* (a kind of rommie which obtained by tapping inflorescences of various palms). *Nira* also used to make brown sugar which known *gula lempeng*. The product of *moke* or *tuak* and *gula lempeng* were sold to fulfill the community daily necessities, and their children school fund. *Tuak* also used as a traditional property by Desa Umauta community in every traditional ceremony such as birth ceremony, wedding and funeral.

In science learning (IPA) process at school, teachers are expected to relate the teaching material with the local culture. Sudarmin *et al.* (2015) stated that scientific approach suggested for education in Indonesia is *Ethnoscience*, that is original knowledge in the form of language, customs and culture, and morals. Joseph (2010) argued that *ethnoscience* approach based on the recognition of culture as a part of education as an expression and communication of an idea. *Ethnoscience* is the activity of transforming original science (knowledge that develops in the community) to be scientific science (Rahayu dan Sudarmin, 2015). In every day, students always interact with the cultural environment of the local area that related to a science concept.

Learning with the ethnoscience approach improves student learning outcomes (Atmojo, 2012). Rosyidah (2010) stated that Ethnoscience-

based learning can improve student learning outcomes and student activities categorized as active. Integrated learning shows that students are interested in and enjoyed the learning process because they are interspersed with local wisdom knowledge, for example, making a product in a certain area (Nisa *et al.*, 2015).

The Learning Process in several Primary Schools in Umauta Village, Bola District, still applied conventional learning. In the learning process although what is improved is the student's cognitive domain but the cognitive learning outcomes of the students are still less than optimal. This is supported by data on student test scores that have not yet reached the KKM that is 75. Of the two schools that have been observed, 48.3% of students scored above the KKM for students at SDN Inpres Umauta, whereas in SDK St.Benedict Wajong there were 50% of students who got scored above the standard grade.

Low student learning outcomes can be caused by low comprehensive of concepts and the application of learning models that do not involve students actively in learning.

The concept comprehension is the ability of students in mastery several subject matter. Students not only remember some concepts but also can explain them in other patterns and apply it to concepts that are following the cognitive structure of students (Fitrah, 2017). The concept comprehension can be interpreted as a person's thought process to process the learning material received so that it becomes meaningful (Fatimah, 2017). The concept comprehension is very important because it is related to the ability of students to understand the relationship between concepts so that it can be use to solve problems (Sadiqin *et al.*, 2017). Through ethnoscience based learning, students are not imitate or accept the information delivered but also create meaning, comprehension and the meaning of information obtained (Laksana & Wawe, 2015).

To improve students' concepts comprehension, the teacher needs to apply learning models that can make students more active. CLIS model carries the steps of students activities in learning the concept taught to engage

students in observation and experiment and make the environment as a source of learning (Samatowa, 2016). The application of CLIS learning models can improve student learning outcomes (Desiantari *et al.*, 2014; Ismail, 2017).

This study attempts to analyze the improvement of students' concept comprehension abilities by applying the CLIS learning models integrated ethnoscience.

## METHODS

This research was conducted on the fifth-grade students of SDN Inpres Umauta Semester 2 2018/2019 Academic Year totaling 32 students. The material taught in this study is about the object changing form.

The research design used in this study was a quasi-experimental model pretest-posttest design. Quasi experimental research in education can be done by selecting a whole class as a group (Creswell, 2014).

The data obtained from test results and student questionnaire responses. The study also applied pretest and posttest. The form of test questions used is an of description test to measure students' understanding of concepts as answers to the formulation of the problem.

Quantitative data analysis is used to analyze individual completeness using the average test, classical completeness and improvement of students' understanding of concept results. The enhancement of students'

concept comprehensive is measured by using the N-gain test with a high increase criterion (N-gain  $\geq 0.70$ ), medium ( $0.30 \leq$  N-gain  $< 0.70$ ), low (N-gain  $< 0.30$ ) according to Hake (1999).

## RESULTS AND DISCUSSION

The quantitative data was taken from students' pretest and posttest score. The pretest was done before applied the CLIS learning models integrated ethnoscience, while the posttest was taken after applied the learning models. The improvement of learning outcomes is calculated after analysis the individual completeness and classical completeness.

Individual completeness was calculated using the average test of *One-Sample t-Test* supported by *SPSS 23.0*. The data used was the result of students' evaluation (posttest) after receiving the treatment CLIS learning models integrated ethnoscience. The result of the calculation showed that the significance value of students is  $0.000 < 0.05$ , which means that students can achieve the classical KKM 75 in CLIS learning models integrated ethnoscience.

The classical completeness was calculated using a proportion test with 75% completeness criteria. The result of proportion test was  $2.48 > 0.3264$  (z-table) which means that the ability of concept comprehension using CLIS learning models has achieved the classical completeness that is 75%. The test result of classical completeness are presented in Table 1.

**Table 1.** Classical Completeness

| Class      | N  | Mean  | Min | Max | Completeness | Incompleteness | Percentage (%) |
|------------|----|-------|-----|-----|--------------|----------------|----------------|
| Experiment | 32 | 81.13 | 70  | 90  | 30           | 2              | 93.75          |

Table 1 shows that the classical completeness of students at V grade achieved 75% after received the treatment CLIS learning models integrated ethnoscience.

The improvement of students' outcomes using N-gain test which obtained from pretest and posttest are presented in Table 2.

**Table 2.** The improvement of students' outcomes

|         | Pretest | Posttest | N-Gain |
|---------|---------|----------|--------|
| Average | 55.156  | 81.125   | 0.401  |

Table 2 explained that students' concept comprehension increased from pretest to posttest and categorized as medium. In other words the application of CLIS learning model is able to improve students' at V grade of SDN Inpres.

Umauta concept comprehension about the changing of object form subject matter.

Indicators of students' concepts comprehensive measured in this study are translating, modeling, classifying, summarizing, predicting, explaining. Each indicator is contained in the pretest and posttest questions given to students. The questions given were in the form of description questions. The scoring for description questions range from 1-10 (Sumaryanta, 2015) with the following conditions: score 10 for a complete and right answer, score 6 for incomplete answer and right, score 1 for the wrong answer and score 0 for no answer.

The result of each indicator improvement of concept comprehension can be seen in Table 3.

Table 3. The Result of Indicator Test of Concept Comprehension

| Indicator    | Score |     | (%)  | Category  |
|--------------|-------|-----|------|-----------|
|              | High  | Low |      |           |
| Translating  | 10    | 6   | 86.3 | Very good |
| Exemplifying | 10    | 6   | 91   | Very good |
| Classifying  | 10    | 6   | 77.5 | Very good |
| Summarizing  | 10    | 6   | 76.3 | Very good |
| Predicting   | 10    | 6   | 88.8 | Very good |
| Explaining   | 10    | 6   | 73.8 | Very good |

Table 3 shows that the indicator improvement of students' concept comprehension categorized as very good. The example of students' answer which showed the students' concept comprehension presented in Figures 1 and 2.

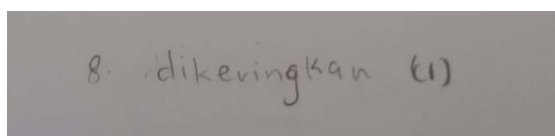


Figure 1. Students' answer for pretest no 8<sup>th</sup>

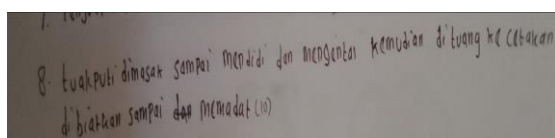


Figure 2. Students' answer for posttest no 8<sup>th</sup>

Figures 1 and 2 present that students' concept comprehension for question number 8<sup>th</sup> increased from pretest with score 1 to 10 at

posttest after applying the CLIS models integrated ethnosience. On the pretest student answered be dried and got 1 score because there was no explanation related to ethnosience. On the other side, on posttest the student answered white *tuak* boiled until thick then poured into the mall and left until solid. The student answer on posttest showed an explanation related to ethnosience.

The improvement of students' concept comprehension supported by the results of the analysis of student response questionnaires about CLIS learning model integrated ethnosience. The results of the questionnaire analysis are listed in Table 4.

Table 4. The Results of The Analysis of Student Questionnaire Responses

| Number of questionnaire items | Total score | Average | Category |
|-------------------------------|-------------|---------|----------|
| 20                            | 602         | 0.94    | Good     |

The results of the questionnaire analysis show CLIS learning model integrated ethnosience responded well by students.

The ability of students concepts comprehension in the pretest is still low because students have never gotten questions related to ethnosience or even example of object form changing as happened in the process of making *tuak* and brown sugar, therefore most of the students are not able to answer the questions. Yoanita dan Akhlis (2015) stated that the achievement of learning outcomes affected by students weaknesses in understanding a concept. On the other hand, the result of the posttest was increased which marked by students can answer the questions about ethnosience correctly.

This is supported by the results of the student response questionnaire where students more understand the material by observing people in making *tuak* process and also conducting an experiment in making brown sugar. This result is line with the research of Agustin *et al.* (2018) which found that ethnosience test instruments can improve student learning outcomes.

CLIS learning model integrated ethnosience is facilitating the students to find out

and make a concept from observing activities so that the students learning become more effective which they can memorize or remember the new material. The way of finding in learning in this research means that students make an experiment and observing to find out the concept of science learned.

Students in groups conduct experiments and observe according to the instructions found on the student worksheet (LKPD). The questions contained in LKPD lead students to find concepts from the material being studied. This is supported by the statement of students in the student response questionnaire that students like to work in groups because it trains students to work together with other friends and is diligent in working on the student worksheets CLIS learning models orient learning activities to find and apply what is learned so that learning is not only learning material from books or teachers' explanations but students are able to understand concepts properly (Sari *et al.*, 2015).

The application of CLIS learning models integrated ethnoscience showed that experiments can form new experiences so students can understand the concept of science in depth. This is line with a study of (Lestari *et al.*, 2018; Widiyatmoko, 2018) who found that CLIS learning models make students more active in learning, especially in experimental activities because students discover their own concepts through experiments. Student activities are carried out in accordance with the stages of the learning model emphasizing students to play an active role in learning by finding and contracting their own knowledge. Based on the result of the questionnaire students' responses showed that students were able to conduct experiments making brown sugar so as to encourage students to find new ideas and dare to express their opinions.

Learning with CLIS learning models integrated ethnoscience educate students to interact with the environment. The use of a learning environment where students can learn through direct observation and then record the results of observations then explained in front of the class. Barak & Dori (2017) stated that abstract

teaching of science concepts makes it difficult for students to understand the concepts being learned. Based on student response questionnaire, it can be seen that students are enthusiastic in learning by observing directly, in this case observing the process of making *tuak*. This is supported by student response questionnaire which states that students are enthusiastic about learning by observing directly in this case observing the process of making *tuak*.

From the test results of the five indicators, it can be seen that the lowest percentage is the explaining indicator, which is 73.8%. This is affected by students are not have the opportunity from teacher to explain material or express their opinions. After being motivated slowly students learn to explain even though they lack courage. However, generally, the indicators of students' concept comprehensive are in the good category.

During the learning process, students were not only listening and record the material explained by the teacher but students are trained to find their answers by observing and experimenting so students understand the concepts of the material being studied. Students are also trained to predict things that occur through observations and conducted experiments.

After getting an explanation about the object changing forms, students were very enthusiastic to mention examples of the object changing forms that they often see so students can answer correctly during the test. This finding is in line with what was stated by Kurniawan (2013) that student activeness in the learning process helps students to more understand the concepts given because what students convey will be easier to remember.

## CONCLUSION

Learning by following the stages of CLIS learning models which begins with the orientation phase, the emergence of ideas, the exchange of ideas, the stage of the conflict situation, the construction of new ideas, the application of ideas, the strengthening of ideas. The application of CLIS integrated ethno science

can improve the ability to understand science concepts. The improvement of each indicator is in the very good category. can improve the ability to understand science concepts. The improvement of each indicator is categorized as very good.

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