The Effect of Contextual Collaborative Learning Based Ethnoscience to Increase Student’s Scientific Literacy Ability

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ABSTRACT
Scientific literacy is used as the primary goal in science education because it is considered to be used to prepare today’s generation. Aspects of scientific literacy consist of the concepts, processes, and attitudes of science that can be used in people’s daily lives, a picture of the success of science education carried out by each country. However, this ability has not been trained optimally through the process of learning science in Indonesia. This research aims to increase students’ scientific literacy ability through contextual collaboration learning based on ethnoscience. This study used a quasi-experimental research method with a pre-experimental design that involved pretest and posttest of one group. This research has been conducted in the Chemistry Education UNDIKMA Mataram for the number of research subjects as many as 31 students. The instrument used is multiple choice tests to measure the achievement the content and process of science students while attitude scale to measure students’ scientific attitudes. The results showed that the achievement of content, process, and science attitudes of students overall has increased in the medium category. This means that the effect of contextual collaborative learning based ethnoscience the capacity of scientific literacy in content, process, and attitude of students.

Introduction
Advances in science and technology have both positive and negative impacts on human life. Positive effects arise due to various facilities that can improve the quality of human life. Ethical, moral, and global issues are negative impacts resulting from the development of science and technology (Sari et al., 2017). Therefore, students need to be equipped with the ability to care and respond to issues that develop in society, think critically and creatively to plan problem solving, and have in-depth knowledge and understanding to be applied in problem-solving (Eny & Wiyarsi, 2019). This can be achieved if students have scientific literacy.

Scientific literacy also refers to the multiplicity of literacy associated with the use of digital technology in the field of science in the form of electronic technology which includes hardware and software that support the science learning process. Therefore, important scientific literacy is
developed because (1) understanding of science can provide individual satisfaction and pleasure after studying nature; (2) to make a decision needed information and scientific thinking; (3) every public discourse and debate needed the involvement of science and technology; (4) and scientific literacy is needed in the world of work because it involves higher-order thinking skills are reasoning, creative thinking, making decisions, and solving problems (Wulandari, 2016). The above description shows the importance of someone having a literacy in science. Therefore scientific literacy is used as a benchmark in education quality.

Scientific literacy can be promoted by problem solving skill in personal and social (Lederman et al., 2013). Therefore, its development on every individual is extremely important. Every individual is demanded to have scientific literacy covering its scientific knowledge, scientific process skill, and scientific attitude. With this, scientific literacy development is important. Every individual is obligated to have scientific literacy including scientific knowledge, scientific process skill, and scientific attitude. Scientific literate society is able to use scientific knowledge, identify questions, and draw a conclusion based on the evidence, in accordance to understand as well as to generate decision related to nature and its changes done to nature through human activities. Erman et al., (2020) suggested that the development of scientific literacy was very important because it could contribute to the social and economic life, as well as to improve making decision skill at the community level and personal. It was strengthened by Wen, et al., (2020) that an individual has scientific literacy skill and technology. It is a person eligible to solve problems by using scientific concepts gained in education based on his level, recognizing product of technology around him, and its positive impact, or the use of the product and its maintenance, creative in creating simplified product technology so his learners are able to decide based on local values and custom.

The findings of this study (OECD, 2018) stated that student literacy achievement is low from all aspects (content, process and context). The 2018 PISA results for scientific competence, Indonesia ranked 62 out of 71 participating countries. In terms of the distribution of literacy itself, nationally only 25.38% of scientific literacy is considered sufficient, while 73.61% is deemed insufficient. This is confirmed by Yustin & Wiyarsi (2019) that the learning environment and climate at school influence variations in student literacy scores. Students scientific literacy is low indicate that there are still many students have not been able to measure body temperature properly, playing on the field in heavy rain, throwing garbage in the river without regard to cleanliness and disasters that can occur from his actions, likes foods that contain additives, not even a few high school students have started smoke. This condition is the causes of the low ability of students’ scientific literacy. Therefore we need learning that can train students' scientific literacy skills. Learning that is considered a potential to practice students' scientific literacy skills is contextual collaborative learning based ethnoscience.

Contextual collaborative learning is a method of combining two methods or modification of the contextual and the collaborative method (Rochayati et al., 2018). Collaboration learning prioritizes learning that involves several students joined together in groups that have different abilities and thoughts for each individual (Ulfiana et al., 2016). Combined with contextual learning, matrices are presented according to the student environment, so students can understand and develop their knowledge (Setiyorini, 2018). Contextual is a holistic learning process that aims to help students understand personal, social and cultural contexts in daily life so students have skills and knowledge of dynamic and flexible (Dewi et al., 2018). Contextual is a connecting learning model real world situations that aim to equip students with knowledge that can applied in concrete daily life (Yulianto & Zaini, 2019). In contextual collaboration learning involves real life contexts either incidentally or informally as an effort to create situations that give rise to specific student-centered learning outcomes. The contextual collaboration learning model is built on the basis that knowledge is a social construction which is a social effort through collaborative learning that focuses on the process and results of being important factors for monitoring and assessing the effectiveness of contextual collaborative learning (Jaimini, 2014). Furthermore, contextual collaborative learning, students are required to work together in small groups to achieve common ground academic goals, such as group assignments related to explaining observed phenomena in everyday life (Xiao, 2012). Dang (2017)
stated that collaborative learning was contextual play an important role in the environmental-based group learning experience. Contextual collaborative learning is a significant shift from a teacher-centered approach, where social interaction is emphasized so that students are able to read, respond and participate by conveying opinions and ideas to discuss and solve problems in everyday life (Haruzuan et al., 2014).

One attempt to explore the environment as a source of learning in science learning is to integrate culture as part of society which is known as ethnoscience learning. Ethnoscience is the recommended study in Indonesia today because it can grow students’ awareness in rediscovering the values of local wisdom and integrating them into the learning process (Wati et al., 2021). Ethnoscience is one of them activities that turn original science into scientific science (Dewi et al., 2019). Ethnoscience can make it easier for students to dig facts and phenomena that exist in society and can be integrated with science (Khoiri et al., 2019). Ethnoscience learning can transforming teacher-centered learning into centered on students as a contextual and meaningful learning (Sumarni, 2018). Students can not only understand material but also apply it in their daily life (Sudarmin et al., 2018). This more attractive to students to learn naturally related science and apply it to living environment (Rahmawati et al., 2019). This learning is also local culture as a part of student appreciation in the form of culture (Wati et al., 2021). Ethnoscience is an interdisciplinary science that combines human and cultural anthropology with science education. The study of the scientific knowledge that is gained by examining the local knowledge that is contained in the culture of a community or ethnic group. Local awareness is derived from local communities’ thought and ideas about daily life, including customs, beliefs and views on the world (Lestari & Fitriani, 2016). Ethnoscience, rooted in students’ lives, is a type of contextual experience (Setiawan et al., 2017). Ethnoscience will allow students to investigate the facts and phenomena present in society and be integrated with scientific knowledge (Melyasari et al., 2018). Ethnoscience can captivate learners because it’s connected to their own regional identity. Ethnoscience may also encourage knowledge and preserve local culture (Supriyadi & Nurvitasari, 2019).

Chemistry learning can be integrated into ethnoscience because it involves contextual experience in everyday life about local wisdom into learning materials and a phenomenon that exists in society (Dewi et al., 2019). Learning chemistry is theoretically teaching students to have the ability to identify chemical problems and making a conclusion based on evidence for the sake of recognizing natural changes and the effect of human interaction on nature (Gorokhov, 2010). This complex world changes quickly, which requires an understanding of chemistry to handle it (Fitriyanti et al., 2019). Because understanding chemistry literacy is highly demanded in formal education (Sumarni et al., 2017). It means that the students should not only know and memorize things related to the concepts of chemistry but also understand and implement it in their daily life (Marks & Eilks, 2009). According to Ariningtyas (2017); Ibe & Nwosu (2017) that scientific literacy can be increased through learning chemistry charge ethnoscience. Perwitasari et al. (2017) & Usman et al. (2019) showed that learning application based ethnoscience in chemistry can improve students’ scientific literacy. Andriani, et al. (2019) stated that contextual based chemistry module development can build student understanding of concepts. The ethnoscience model of chemistry learning can improve scientific literacy for students (Dewi et al., 2019; Basyari et al., 2019; Fathonah & Subali, 2020).

A study showed that contextual collaboration learning can understand and develop their knowledge (Said et al., 2014; Zhong et al., 2012; Wiyarsi et al., 2020). This was confirmed by (Masufah & Ellianawati, 2020) that the learning model using a contextual with ethnoscience can improve students’ scientific literacy ability in developing local cultural values. Supriyadi & Nurvitasari (2019) founded that contextual learning based ethnoscience can inventory indigenous science that grows and develops in the Malind (Papua) tribe. Supriyadi et al., (2020) stated that malind ethnoscience has the potential to be developed in contextual learning tools. Rahmawati et al., (2019) founded that ethnoscience-based contextual learning has a significant influence on student learning outcomes and activeness.
In Indonesia, there are not many studies that examine contextual collaborative learning based ethnoscience in improving scientific literacy. Previous research studies in Indonesia only focused on collaborative learning or ethnoscience-based contextual learning. Theoretically, the CCLBE model describes a new theoretical perspective that is inherited from the cognitive approach that lies, and is called 'socially shared cognition'. This theory views a study group as a distributed cognitive system individual. It does not focus on individual contributions, but on shared representations constructed by the group (Jaimini, 2014; Xiao, 2012). With this perspective, the main reason why contextual collaborative learning based ethnoscience is efficient that members learn to think interactively: thinking not only manipulating mental objects, but also interactions with other people and with the environment as a real learning resource. Therefore, contextual collaborative learning based ethnoscience (CCLBE model) needs to be applied because understanding of content, processes, and cultural contexts in chemistry will be able to improve students scientific literacy ability. This is confirmed by Erman et al., (2020) that scientific literacy is very important because it can contribute to social and economic life, as well as improve decision-making skills at the community and personal levels.

This research aims to increase students’ scientific literacy ability through contextual collaborative learning based ethnoscience. Formulation of research problem are 1) How is the difference in the significance of students' scientific literacy before and after taught the CCLBE model?, 2) How is the effectiveness of the CCLBE model in improving students' scientific literacy ability?. Therefore, it is necessary to do learning which can relate the daily lives of students with cultural environment through contextual collaborative learning based ethnoscience to improve students' literacy so learning becomes more meaningful, and can be used for introduce the local culture of the place student residence in accordance with student characteristics. So, the novelty of this research is learning chemistry in social life mostly related to maximizing context local wisdom so that it can stimulate motivation for students to build knowledge and integration of cultural competences in different professions will be decisive key in improving scientific literacy in terms of content, context and attitude.

Methods

This study used a quasi-experimental research method with a pre-experimental design that focused on contextual collaborative learning based ethnoscience implementation in studying, learning, and teaching to improve students' scientific literacy ability. This research aimed to improve students’ scientific literacy ability by using the contextual collaborative learning based ethnoscience model. Data in this research is students’ scientific literacy ability indicator that can be measured through a student’s ability to solve the designed test. The distribution of aspects of scientific literacy is presented in Table 1.

Table 1

<table>
<thead>
<tr>
<th>Aspects of Scientific Literacy</th>
<th>Indicator of Scientific Literacy</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>• The Formation Process of Petroleum</td>
<td>1, 2, 3, 4, 5, 6, 7, 8, 9, 10</td>
</tr>
<tr>
<td></td>
<td>• The Main Components of Petroleum Compilers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Impact of Burning Oil on Water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Impact of Combustion of Petroleum on Land</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Impact of Burning Petroleum on Health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The Impact of Burning Petroleum on the Economy</td>
<td></td>
</tr>
</tbody>
</table>
The form of pre-experimental design in this study was One Group Pretest-Posttest Design (Sugiyono, 2013). The shape of the design is illustrated in Table 2.

Table 2

Pre-experimental Design

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Group</td>
<td>$O_1$</td>
<td>$O_2$</td>
</tr>
</tbody>
</table>

Information:

$O_1$ = Pretest value before CCLBE model.

$O_2$ = Posttest value after CCLBE model.

This research has been conducted in the Chemistry Education UNDIKMA Mataram for the number of research subjects as many as 31 students. The sampling technique is saturated sampling, namely the technique determining the sample if the population is the same as the sample (Sugiyono, 2013). The trial results of the scientific literacy instrument showed that the probabilities of all items were above 5%. Thus, it can be concluded that all items are valid, as shown in table 2.

Table 3

The Validity of Scientific Literacy Instrument

<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.665**</td>
<td>.862**</td>
<td>.482**</td>
<td>.564**</td>
<td>.521**</td>
<td>.536**</td>
<td>.556**</td>
<td>.505**</td>
<td>.531**</td>
<td>.544**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.008</td>
<td>.001</td>
<td>.004</td>
<td>.003</td>
<td>.002</td>
<td>.005</td>
<td>.003</td>
<td>.002</td>
</tr>
<tr>
<td>Criteria</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
</tr>
<tr>
<td>Item</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.593**</td>
<td>.617**</td>
<td>.672**</td>
<td>.706**</td>
<td>.512**</td>
<td>.866**</td>
<td>.506**</td>
<td>.636**</td>
<td>.534**</td>
<td>.531**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.001</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.004</td>
<td>.000</td>
<td>.005</td>
<td>.000</td>
<td>.000</td>
<td>.003</td>
</tr>
<tr>
<td>Criteria</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
</tr>
<tr>
<td>Item</td>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.520**</td>
<td>.580**</td>
<td>.709**</td>
<td>.531**</td>
<td>.534**</td>
<td>.636**</td>
<td>.506**</td>
<td>.617**</td>
<td>.866**</td>
<td>.544**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.004</td>
<td>.001</td>
<td>.000</td>
<td>.003</td>
<td>.003</td>
<td>.000</td>
<td>.005</td>
<td>.000</td>
<td>.000</td>
<td>.002</td>
</tr>
<tr>
<td>Criteria</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
<td>Valid</td>
</tr>
</tbody>
</table>

The reliability of scientific literacy instrument showed that value for 30 items was 0.85 with very high criteria as shown in table 4.
The Reliability of Scientific Literacy Instrument

The instrument used was a reasonable multiple-choice question used to measure students’ scientific literacy ability. The different students’ scientific literacy before and after implemented CCLBE model and increase students’ scientific literacy ability in this study was determined based on T-test and N-Gain. The calculation results obtained $g$ value are then interpreted into three categories namely:

Table 5

<table>
<thead>
<tr>
<th>Average Gain</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.00 &lt; g \leq 0.30$</td>
<td>Low</td>
</tr>
<tr>
<td>$0.30 &lt; g \leq 0.70$</td>
<td>Medium</td>
</tr>
<tr>
<td>$0.70 &lt; g \leq 1.00$</td>
<td>High</td>
</tr>
</tbody>
</table>

Note. (Dewi & Mashami, 2019)

Findings and Discussion

To find out the different students’ scientific literacy before and after implemented CCLBE model and increase students’ scientific literacy ability were analyzed using T-test and N-gain, as seen from the table, is presented as follows.

Table 6

<table>
<thead>
<tr>
<th>Scientific Literacy</th>
<th>Independent Samples Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Levene’s Test for Equality of Variances</td>
</tr>
<tr>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>2.544</td>
</tr>
</tbody>
</table>
Based on table 6, the Sig. (0.013) <0.05, this indicates that there is a major gap between students scientific literacy before and after through contextual collaboration learning based ethnoscience model. The findings of these studies (Abonyi et al., 2014; Sumarni, 2018; Rahmawati et al., 2019; Adhi et al., 2018) showed that the introduction of ethnoscience-based chemistry learning will boost scientific teaching literacy.

a) The Increase scientific literacy ability of content aspects

Table 7

<table>
<thead>
<tr>
<th>Subtopics</th>
<th>% Pretest</th>
<th>% Posttest</th>
<th>% N-Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Formation Process of Petroleum</td>
<td>34.5</td>
<td>65.5</td>
<td>44.9</td>
</tr>
<tr>
<td>The Main Components of Petroleum Compilers</td>
<td>44.5</td>
<td>75.7</td>
<td>56.2</td>
</tr>
<tr>
<td>The Impact of Burning Oil on Water</td>
<td>46.7</td>
<td>77.0</td>
<td>56.8</td>
</tr>
<tr>
<td>The Impact of Combustion of Petroleum on Land</td>
<td>52.0</td>
<td>78.0</td>
<td>54.1</td>
</tr>
<tr>
<td>The Impact of Burning Petroleum on Health</td>
<td>55.3</td>
<td>80.5</td>
<td>56.3</td>
</tr>
<tr>
<td>The Impact of Burning Petroleum on the Economy</td>
<td>56.5</td>
<td>80.0</td>
<td>54.0</td>
</tr>
<tr>
<td>Average</td>
<td>48.3</td>
<td>76.1</td>
<td>53.7</td>
</tr>
</tbody>
</table>

Student achievement in each content is shown in table 7 that there is the highest increase in the content "Impact of Burning Petroleum on the Waters" and the lowest increase occurred in the content "Process of Forming Petroleum." Students' mastery of the material "Impacts of Burning Petroleum on the Water" experienced the highest increase because the dominant activity when discussing this content was a collaboration discussion activity based on facts and experiences in daily life. Collaboration learning prioritizes learning that involves several students joined together in groups that have different abilities and thoughts for each individual (Ulfiana et al., 2016). Combined with contextual learning, matrices are presented according to the student environment so that students can understand and develop their knowledge (Setiyorini, 2018). While ethnoscience is one type of contextual learning. Ethnoscience is a cross-disciplinary science that connects the human or cultural anthropology with science learning. The study of the scientific knowledge that is gained by examining the local knowledge that is contained in the culture of a community or ethnic group. Local knowledge is derived from reasoning and ideas from local communities about everyday life, including traditional culture, values, beliefs, and world views (Lestari & Fitriani, 2016; Dewi et al. 2020; Dewi, 2019). Ethnoscience, rooted in students ' lives, is a type of contextual experience (Sudarmin, 2014).
b) The Increase scientific literacy ability of process aspects

Table 8

<table>
<thead>
<tr>
<th>Process Indicator</th>
<th>% Pretest</th>
<th>% Posttest</th>
<th>% N-Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identifying scientific issues</td>
<td>54,5</td>
<td>68,5</td>
<td>30,7</td>
</tr>
<tr>
<td>Explain scientific phenomena</td>
<td>64,5</td>
<td>78,7</td>
<td>40,0</td>
</tr>
<tr>
<td>Using scientific evidence</td>
<td>53,7</td>
<td>77,0</td>
<td>50,3</td>
</tr>
<tr>
<td>Average</td>
<td>57,6</td>
<td>74,7</td>
<td>40,3</td>
</tr>
</tbody>
</table>

Student achievement in each content is shown in Table 8, showed that the highest increase in the content "Impact of Burning Petroleum on the Waters" and the lowest increase in the content "Process of Forming Petroleum." Students' mastery of the material "Impacts of Burning Petroleum on the Water" experienced the highest increase because the dominant activity when discussing this content was a collaboration discussion activity based on facts and experiences in daily life. Collaboration learning prioritizes learning that involves several students joined together in groups that have different abilities and thoughts for each individual (Ulfiana et al., 2016). Combined with contextual learning, matrices are presented according to the student environment so that students can understand and develop their knowledge (Setiyorini, 2018). While ethnoscience is one type of contextual learning. Ethnoscience is a cross-disciplinary science that connects the human or cultural anthropology with science learning. The study of the scientific knowledge that is gained by examining the local knowledge that is contained in the culture of a community or ethnic group. Local knowledge is derived from reasoning and ideas from local communities about everyday life, including traditional culture, values, beliefs, and world views (Lestari & Fitriani, 2016). Ethnoscience, which is rooted in students' lives, is a form of contextual experience (Sudarmin, 2014).

c) The Increase Scientific Literacy Ability of Attitude Aspects

Table 9

<table>
<thead>
<tr>
<th>Attitude Indicator</th>
<th>% Pretest</th>
<th>% Posttest</th>
<th>% N-Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Responsibility for resources and the environment</td>
<td>65,5</td>
<td>76,5</td>
<td>31,8</td>
</tr>
<tr>
<td>Support science inquiry</td>
<td>64,5</td>
<td>80,7</td>
<td>45,6</td>
</tr>
<tr>
<td>Interest in science</td>
<td>68,7</td>
<td>85,0</td>
<td>52,0</td>
</tr>
<tr>
<td>Average</td>
<td>66,2</td>
<td>80,7</td>
<td>43,1</td>
</tr>
</tbody>
</table>

The attitude aspect is the last aspect of scientific literacy. Unlike the two previous elements, this aspect of attitude looks more at students' responses to scientific issues and supports in scientific inquiry. To capture the achievements of students' scientific literacy aspects of belief used a scale instrument attitude amounting to 16 statements, where each report consists of 4 answer choices, namely strongly agree, agree, disagree, and strongly disagree. The attitude of science examined in this study includes three indicators, including (1) overall responsibility, the attainment of science attitudes of students before and after getting contextual collaboration learning-based learning ethnoscience can be seen in Table 4 illustrates that there is an increase in the attitudes of science attainment after getting contextual collaboration learning-based ethnoscience even though it is still in the moderate category. This is because learning implemented in the classroom involves phenomena that occur in everyday life so that such learning processes can have a positive impact on improving students' scientific
attitudes in resources and the environment; (2) support science inquiry; (3) interest in science. The students’ scientific literacy ability in aspects of attitude begins to be grown by giving contextual problems based on ethnoscience when starting learning activities. Because ethnoscience is knowledge acquired based on local culture that can be innovated in science-based learning at class (Abonyi et al., 2014). Ethnoscience is a learning approach that elevates local culture or wisdom to become an object of science learning. The introduction of science learning from the perspective of local culture and structured local knowledge relating to certain natural phenomena and events would increase students’ scientific interests and make it easier for students to understand them (Dewi et al., 2019).

Conclusion and Implications

Based on the above definition, it can be concluded that there is a major gap between students scientific literacy before and after implemented CCLBE model and scientific literacy ability has increased in the medium category on capacity of students in content, process and attitude aspects. The uniqueness of contextual collaboration learning based ethnoscience (CCLBE) model is that students can integrate their knowledge with cultural competences in a different profession so that become the key determinants in improving students’ scientific literacy in terms of content, context and attitude. Recommendations for practitioner have to identify many things in the local context relevant to the concept of chemistry, not only on content, process and attitude but also in context and behavioral competencies of students in chemistry. Suggestions for future researchers to conduct similar research to demonstrate the effectiveness of the CCLBE model, especially in assessing the scientific literacy of students from other learning fields.

Acknowledgment

Thank you to the Director-General of Belmawa Ristekdikti for funding this research project. Thank you also to the Rector of the Universitas Pendidikan Mandalika Mataram for support, encouragement, and the Chairman of the LP3M UNDIKMA Mataram for research guidance.

References


**Appendix**

1. Lesson Plan

![Lesson Plan Image]

**RENCANA PEMBELAJARAN SEMESTER**

<table>
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<th>Nama MataKuliah</th>
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<tr>
<td>Na Materai</td>
<td></td>
<td>Citra Ayu Dewi, M.Pd</td>
<td>26 Oktober 2019</td>
<td></td>
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</table>

**DENAH PEMBELAJARAN**

1. Identitas MataKuliah
   - Nama Departemen: Pendidikan Kimia
   - Nama MataKuliah: Kimia Dasar
   - Kode MataKuliah: PMK111E/G2-1
   - Bobot SKS: 3 (ting)
   - Jenjang: SL
   - Semester: 1 (Satu)
   - Siswa (Wajib/Pilihan): Wajib

2. Deskripsi MataKuliah
   - Materi dalam modul mengenai konsep dan prinsip dalam Struktur atom, Sistem periodik unsur, Batas kimia dan struktur molekul, Kimia unsur, Stoikiometri, Energetika kimia, Kimia klorida, Sifat dan hibridasi, serta melalui kegiatan laboratorium yang mendukung.

3. Capaian Pembelajaran Luasar
   - S: Belajar sama dan memiliki kepemilikan sosial serta kepemilikan teknologi masyarakat dan lingkungan.
Dewi, Erna, Martini, Haris & Kundera, 2021

| P3 | Mengenali prinsip-prinsip K3 (Keselamatan dan Keamanan Kerja), pengelolaan laboratorium dan penggunaan peralatan serta cara menggunakan instrument lainnya.  
| KU2 | Mampu menunjukkan kinerja mandiri, berhati, dan bertanggung jawab.  
| KU7 | Mampu bertanggung jawab atas pencapaian hasil kerja kelompok dan melakukan alternatif dan evaluasi terhadap penyelidikan pekerjaan yang digagas kepada penerapan yang berada di bawah tanggungjawabnya.  
| KK3 | Mampu menunjukkan, mendemonstrasikan dan mengendalikan kemajuan praktik dalam rangka pelaksanaan pendekatan saintifik dengan menunjukkan potensi sumber daya yang tersedia serta memperhatikan aspek keselamatan dan keamanan kerja (K3).  

4. Capaian Pembelajaran Matematika (CPMK)

CPMK 1: Mahasiswa mampu bekerja sama dan memiliki kepekaan sosial serta kepedulian terhadap masyarakat dan lingkungan serta mengusung prinsip-prinsip K3 (Keselamatan dan Keamanan Kerja), pengelolaan laboratorium dan penggunaan peralatan serta cara menggunakan instrument lainnya (K6, P7).

CPMK 2: Mahasiswa mampu menunjukkan kinerja mandiri, berhati, dan bertanggung jawab atas pencapaian hasil kerja kelompok dan melakukan alternatif dan evaluasi terhadap penyelidikan pekerjaan yang digagas kepada penerapan yang berada di bawah tanggungjawabnya dan memecahkan, meneliti dan mengendalikan kemajuan praktik dalam rangka pelaksanaan pendekatan saintifik dengan menunjukkan potensi sumber daya yang tersedia serta memperhatikan aspek keselamatan dan keamanan kerja (K2, KU2, KK3).

5. Deskripsi Rencana Pembelajaran

Rencana waktu setiap pertemuan pelaksana:

- Tugas Mulai: 3 x 59’
- Tugas Tertentu: 3 x 60’
- Tugas Mandiri: 3 x 60’

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| 1    | Dengan mengacu gambar, siswa dapat menjelaskan proses pembentukan minyak bumi dan gas alam.  
      | Diberikan data tentang komposisi penyusutan | pembelajaran | Model Oil Field | 2540 | - Tanggung jawab dan kompetensi  
      |  
| 2    | minyak bumi, rencan mula mula dapat menunjukkan komponen-komponen utama penyusutan minyak bumi.  
      | Dengan melakukan analisis siswa dapat menjelaskan bagian penyusutan berasal dari penggunaan alat dan teknik pemboran yahoo minyak bumi.  
      | Diberikan data tentang kualitas bahan, siswa dapat mempelajari kualitas bahan benda dan lingkungan okusnya.  
      |  
| 3    |  
      | Dengan menunjukkan sesuai dengan terbentuk pergerakan residu minyak bumi dalam meluber petrolatun.  
      | Melihat deskripsi dan bahan siswa dapat mengendalikan dan memperbaharui hasil terkait dengan lingkungan dan kesehatan serta cara mengatasi.  
      | Memperhatikan hasil pembelajaran serta memperbaiki.  
      |  

Stal/ Dana II. Jakarta: Eland.  
2. The implementation of the CCLBE model on hydrocarbon topics
Dewi, Erna, Martini, Haris & Kundera, 2021
Dewi, Erna, Martini, Haris & Kundera, 2021