Ethnoscience Studies in Songket Sasak Cloth Motifs: Prospective Science Teacher Perceptions

Agus Muliadi¹, Suhirman², M. Khairul Wazni³, M. Yamin⁴, Yusran Khery⁵

1 Department of Biology Education, Universitas Pendidikan Mandalika, Mataram, Indonesia.
2 Department of Biology Education, Universitas Islam Negeri Mataram, Mataram, Indonesia.
3 Department of Biology Education, Universitas Hamzanwadi, Indonesia.
4 Department of Biology Education, Universitas Mataram, Mataram Indonesia.
5 Department of Chemistry Education, Universitas Pendidikan Mandalika, Mataram, Indonesia.

Abstract: The aims of this study were to explore the perceptions of prospective science teachers towards ethnoscience studies in the songket cloth motif of the sasak tribe. This exploratory research conducted in three education study programs namely Biology, Chemistry, and Physics Education with 53 prospective science teachers involved as research subjects. Closed questionnaire with likert scale and expertly validated applied for data collection. The data were analyzed by quantitative descriptive statistics, Anova test and t-test inferential statistics. The results showed that (1) perception of prospective science teachers has an average score in the "Good" category in terms of gender, region, study program; (2) there were no significant differences in the perceptions in male and female prospective science teacher based on t test significance value of 0.455 > 0.05; (3) there were no significant differences in prospective science teacher's perception refer to origin (native Lombok and non-native) based on t test significance value of 0.466 > 0.05; (4) there were no significant differences in the perception of prospective science teachers in the biology, chemistry, and physics education study program based on Anova's significance value of 0.423 > 0.05.

Keywords: Ethnoscience; Songket; Prospective science teacher.

Introduction

Education is a deliberate and structured activity (Purwanto, 2011) to empower the potential of each generation to be able to develop and build civilization in the future (Hadi et al., 2019; Hadi & Ahied, 2017). The development of civilization can be forced by strengthening the understanding of the nation's children towards the legacy of their predecessors in the surrounding environment such as culture and customs (Sarini & Selamet, 2019). (Hadi & Ahied, 2017) affirming that education is one of the effective structured efforts to introduce culture through learning activities. According to (Suastra, 2010) that education has a formal role to cultivate and acculturate the behavior of students in preserving culture. Education and socio-culture have a positive correspondence that must be realized in learning for generations of the nation (Trianto., 2014). Socio-cultural can generate certain contributions to the student's learning experience both on cognitive, affective, and psychomotor aspects (Irawan & Muhartati, 2019). (Hadi et al., 2019) states that socio-cultural diversity in Indonesia can be optimized to support student learning in schools.

Indonesia is one of the nations with a diversity of tribes, cultures, regional languages, customs, and arts (Sarini & Selamet, 2019). Daily social activities are accompanied by a thriving culture and heritage from its predecessor generations (Arlianovita et al., 2015). Lombok's most famous culture reaching abroad is typical traditional cloth weaving of Sasak tribe which in the local language called nyensek. Based on observations, it is known that nyensek created among the women of the Sasak tribe has produced weaving cloth called songket.
with typical Sasak motifs. The songket cloth motifs are varied and each has a strong philosophical meaning in life of Sasak tribal community (Sumadewa & Hasbullah, 2021). This is confirmed by the opinion of (Jayadi, 2017) that the songket cloth motif is a form of cultural expression of the Sasak tribal people inherited to each generation. The meaning of each songket cloth motif is to provide community understanding of the local wisdom symbols that have been cultivated in the Sasak tribe (Hasbullah et al., 2020).

The popular motifs of typical Songket sasak cloth is wayang, subalnale, keker or merak, bintang empat, and lumbung/alang (Nurmeisarah et al., 2015). (Misnawati, 2016) research results describe that (1) The wayang motif reconstruction is inspired by the couple of bride and groom, and Tunjung (Mimusops elengi) flower images, means that human beings must live together and respect each other; (2) the subalnale motif reconstruction is inspired by tanjung and kenanga (Cananga odorata) flower images, which means the Almighty based on the word Subhanallah; (3) the keker and merak motif reconstruction is inspired by peacocks and tree branches, means eternal holy love; (4) the bintang empat motif reconstruction is inspired by four-star (Morning Star) and Ceplok (Gardenia jasminoides) flower crown images, means four cardinal directions in life; (5) the alang motif reconstruction is inspired by alang or lumbung house, Tunjung flower/petals, and kenanga flower crown images, means well-being and prosperity.

According to (Misnawati, 2016), songket cloth motifs inspired by biodiversity in people's lives such as animal species, types of flowers, and the structure of the flower, contains information of indigenous science that relevant to elaborate the natural sciences concepts. According to (Hadi et al., 2019) indigenous science based on community culture is important to directing exploration of science learning concept in the classroom. The concept of science can be explored through indigenous science in songket cloth motifs to strengthen concepts, attitudes, and skills (Kartono et al., 2010). This is in accordance with the opinion (Koes, 2003), the key key in science learning is to actively involve students to interact with concrete objects in everyday life such as songket cloth motifs. Learning science concepts requires the nearby environment and socio-culture concepts as a learning resource (Arlianovita et al., 2015).

Indigenous science elaboration of songket cloth motifs in science concepts learning is known as a form of ethnoscience learning (Asmaningrum et al., 2021). Ethnoscience is an scientific exploration of indigenous science (Sarini & Selamet, 2019). This ethnoscience study has a focus on integrating the indigenous cultural values of the people into science learning (Parmin, 2017). The cultural values contained in the symbolic motifs of songket cloth contain indigenous science that has been known to the public in descending, however it has not been scientifically formalized in science learning (Asmaningrum et al., 2021). Therefore, ethnoscience learning is essential to preserve the large number of cultural values in Indonesia (Sudarmin, 2014).

Ethnoscience learning has relevance to the main objectives of science education set by UNESCO to create a young generation who has science and cultural literacy (Sudarmin & Asyhar, 2012). Ethnoscience learning is important to build conservation attitudes and preventing destruction of cultural and traditions distinctiveness of Sasak tribe (Kasa, 2011).

Ethnoscience-based science learning can facilitate meaningful learning (Akmal et al., 2021), by exploration activities and application of the concept of science in indigenous science or local wisdom of the nearby community (Puspasari et al., 2019; Toharudin & Setia, 2017). This is in accordance with the opinion (Khoiri & Sunarno, 2018), Ethnoscience is an interesting learning approach because of indigenous science reconstruction of nearby community into scientific knowledge so that more beneficial for students well-being (Mardianti et al., 2020; Suastra, 2010; Wahyu, 2017). Meaningful learning can facilitate students to learning by doing, connect the concepts of science studied with cultural values and traditions in daily life (Dewi et al., 2019; Khoiri & Sunarno, 2018; Puspasari et al., 2019).

The ethnoscience approach is effective for integrating cultural values in science subject (Purramasari et al., 2021). Ethnoscience approaches are important for building cultural care attitudes and tolerance for local cultures and traditions diversity of a region and sustainable development based on local potency (Akmal et al., 2021; Khery et al., 2022; Parrish & Linder-vanberschot, 2010; Wahyu, 2017). This is reinforced by (Mardianti et al., 2020), ethnoscience approaches can fortify students from the acculturation of foreign cultures that is transformed massively by electronic media in today's digital age. The ethnoscience approach is effective for exploring procedural knowledge of cultural values and deeply oriented to integrated understanding than just a deep understanding (Chiappetta & Koballa, 2006; Listyawati, 2012; Wahyu, 2017). This is supported by (Emdin, 2011) study that the ethnoscience approach can improve students competency, due to increasing in motivation and enthusiasm (Damayanti et al., 2017). Departing from this, the use of indigenous science of songket cloth motifs in science learning has the potential to strengthen students science and cultural literacy (Arlianovita et al., 2015; Pertiwi & Firdausi, 2019). Therefore, deeply important for prospective science teachers to have ethnoscience insights that must be oriented in learning and everyday life in the midst of the rapid development of science and technology that construct modern science (Parmin, 2017; Sarini & Selamet, 2019; Sudarmin, 2014).

For further development of science learning in higher
education, researchers consider the necessary of investigating prospective science teacher perceptions of entonsains-based science learning on typical Songket sasak motifs

Method

This study was carried out by exploratory descriptive research (Muliadi et al., 2021; Muliadi & Mirawati, 2020), to describe the perception of prospective science teachers about ethnoscience in the Sasak tribe Songket. Through an ex post facto approach, researchers examine cause-and-effect relationships without manipulation or treatment, but measure the data of an event that has occurred (Arikunto, 2016; Singarimbun & Efendi, 2006). The were 53 prospective science teachers of education study program of biology (33), physics (13), and chemistry (7) of Universitas Pendidikan Mandalika as respondents that obtained by convenience sampling techniques by considering the accessibility of students in filling out the questionnaire that has been shared in the google form (Fink, 2011).

Data collected using closed questionnaire instruments with a likert scale of 1 to 5 ranging from strongly disagree to strongly agree (Muliadi, 2020a) already available in online google form (Adha et al., 2020). The questionnaire is prepared in 20 points of statement with reference to indicators of prospective science teachers perceptions about ethnoscience studies developed (Rikizaputra et al., 2021). The questionnaire has been declared validaty by experts.

Data was analyzed by quantitative descriptive statistics to describe prospective science teacher perceptions of ethnoscience studies in term of sasak tribe songket motifs. Perception data is interpreted in the form of categories by the assessment criteria developed (Muliadi, 2020b) as presented on Table 1.

In table 2 it can be seen that (1) The perception of both male and female prospective science teacher have good category with average score of 3.20 and 3.28 respectively; (2) The perception of both Lombok native and nonnative prospective science teacher have good category with average score 3.24 and 3.32 respectively; (3) perceptions of prospective science teachers in study programs, biology, physics, and chemistry education, have good category with average score of 3.30, 3.24 and 3.11 respectively. A comparison of each variation’s average is shown in Figure 1.

The research data were further analyzed by inferential statistics i.e. (1) Anova test (Analisis of Varians) with 5% degree of significance to evaluate the comparison of prospective science teacher perceptions among study programs; (2) independent sampel t-test with 5% degree of significance to analyzed to evaluate the comparison of prospective science teacher perceptions between gender and regional origin. The formulation of the statistical hypothesis is \( H_0: \mu_1 = \mu_2 \) (no significant difference in prospective science teacher perception) dan \( H_1: \mu_1 \neq \mu_2 \) (significant difference in prospective science teacher perception). If the Anova test and t-test \( p(Sig.) \)-value smaller than 0.05, then \( H_0 \) is rejected and \( H_1 \) is accepted and vice versa.

Result and Discussion

Data description of prospective science teacher’s perceptions toward ethnoscience studies in songket sasak cloth motif described on Table 2.

Table 2. Prospective science teacher’s perceptions

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>( \Sigma ) Score</th>
<th>( \bar{\mu} )</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>15</td>
<td>48.00</td>
<td>3.20</td>
<td>Good</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>124.65</td>
<td>3.28</td>
<td>Good</td>
</tr>
<tr>
<td>Origin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lombok Native</td>
<td>41</td>
<td>132.76</td>
<td>3.24</td>
<td>Good</td>
</tr>
<tr>
<td>Nonnative</td>
<td>12</td>
<td>39.88</td>
<td>3.32</td>
<td>Good</td>
</tr>
<tr>
<td>Study Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology Education</td>
<td>33</td>
<td>108.76</td>
<td>3.30</td>
<td>Good</td>
</tr>
<tr>
<td>Physic Education</td>
<td>13</td>
<td>42.12</td>
<td>3.24</td>
<td>Good</td>
</tr>
<tr>
<td>Chemistry Education</td>
<td>7</td>
<td>21.76</td>
<td>3.11</td>
<td>Good</td>
</tr>
</tbody>
</table>

Figure 1. A comparison of each variation’s average

Parametric statistical analysis of data of prospective science teacher’s perceptions toward ethnoscience...
studies in *songket sasak* cloth motif has met the prerequisite test of homogeneity and normality at the level of significance 5% (0.05) as presented in Table 3.

### Table 3. Homogeneity and normality test results

<table>
<thead>
<tr>
<th></th>
<th>Levenes Statistic test score</th>
<th>Sig.</th>
<th>Kolmogorov-Smirnov’s test score</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>0.944</td>
<td>0.396</td>
<td>0.494</td>
<td>0.968</td>
</tr>
</tbody>
</table>

Table 3 shows the significance value of the *Levenes Statistic test score* is 0.396 > 0.05 means data variant is homogeneous. The significance value of the *Kolmogorov-Smirnov’s test score* is 0.968 > 0.05 means data distribution is normal.

The differences in the perceptions of prospective science teacher refers to gender and origin (Lombok native and nonnative) was analyzed by independent sampel t-test at the level of significance 5% (0.05) as presented in the Table 4.

### Table 4. Independent sampel t-test refer to gender and origin

<table>
<thead>
<tr>
<th>Group</th>
<th>t-test for Equality for Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t</td>
</tr>
<tr>
<td>Prospective science teacher’s perceptions</td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td>Origin</td>
</tr>
</tbody>
</table>

On Table 5 can be seen t-value of Prospective science teacher’s perceptions refer to gender (-0.752) and origin (-0.734) have significance value smaller than 0.05 of 0.455 and 0.466 respectively, so that $H_1$ is rejected and $H_0$ is accepted. It can be concluded that there is no significant difference in prospective science teacher’s perceptions toward ethnoscience studies in *songket sasak* cloth motif refers to both gender and origin.

The differences in the perceptions of prospective science teacher refers to study program was analyzed by Anova (*Analysis of Variance*) at the level of significance 5% (0.05) as presented in the Table 5.

### Table 5. ANOVA test result

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>0.205</td>
<td>2</td>
<td>0.103</td>
<td>0.876</td>
<td>0.423</td>
</tr>
<tr>
<td>Within Groups</td>
<td>5.863</td>
<td>50</td>
<td>0.117</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6.068</td>
<td>52</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of Anova test in table 4 present significance value of F (0.876) is 0.423 > 0.05 so that $H_1$ is rejected and $H_0$ is accepted. This means that there is no significant difference in prospective science teacher’s perceptions refers to study program (biology, physics, and chemistry education) toward ethnoscience studies in *songket sasak* cloth motif.

Elaboration of the research results explains that prospective science teacher of biology, chemistry, and physics education have a good perception of ethnoscience studies in *songket sasak* cloth motifs. These results show that prospective science teachers have knowledge and *indigenous science* information in *songket* cloth motifs. They believe that its application in learning science concepts is an interesting learning innovation. This is in accordance with (Lee & Kim, 2018) opinion that a person's attitude and knowledge towards the learning of science is bridged by his perception of science. Good perceptions confirm positive response to ethnoscience in *songket cloth motifs* and their application to science learning. According to (Aristolini et al., 2019), the response described whether students rejected or accepted the concept of learning. They could have gained knowledge from various information. A good perception of ethnoscience learning is an important aspect to explains prospective science teachers fairly interest in ethnoscience learning (Dewi et al., 2019; Fulmer et al., 2019; Hacieminoglu, 2016; Julianto et al., 2018; McDonald et al., 2021).

The results of this study explained that there were no significant differences in student perceptions based on study program, gender, and regional origin. This explains that all prospective science teacher have an equally good perception and at the same time show their self-efficacy strength on the importance of ethnoscience-based learning. They gave above average responses to inclusion idea of indigenous science of songket cloth motifs on science learning. This is in accordance with the results of (Misnawati, 2016) study that *songket* cloth motifs inspired by biodiversity in people's lives such as animal species, flower types, and flower structures, contain relevant *indigenous* science information to be elaborated in the concept of science learning. According to (Hadi et al., 2019), *indigenous science* contained in community culture is important to explore in the concept of science learning. The concept of science learning can be explored from *indigenous science* in songket cloth motifs to strengthen concepts, attitudes, and skills (Kartono et al., 2010). This is confirmed by the opinion of (Koes, 2003) that the key in science learning is must be able to facilitate students to actively interact with concrete objects in everyday life such as *songket cloth motifs*. Learning science concepts requires the concept of the nearby environment and socio-culture as a learning resource (Arlionovita et al., 2015; Dewi et al., 2019; Khery et al., 2022).

Respondents of this study explained their belief that ethnoscience-based learning through *songket cloth motifs* could strengthen science and cultural literacy, and
can shape the character of cultural concerns. According to (Dewi et al., 2019), ethnoscience-based learning has improved student’s science literacy effectively. According to (Kartono et al., 2010), the concept of science learning can be explored from indigenous science in songket cloth motifs to strengthen concepts, attitudes, and skills. They also believe that ethnoscience-based learning could be enjoyable. This is in line with opinion that ethnoscience-based science learning could facilitate meaningful learning through exploration and applications of science concepts in indigenous science or local wisdom of the nearby community (Akmal et al., 2021; Puspasari et al., 2019; Toharudin & Setia, 2017).

(Koes, 2003; Suryati et al., 2017) argues that the key in fun science learning is to actively engage learners to interact with concrete objects in everyday life such as songket cloth motifs. Learning science concepts requires the concept of the nearby environment and socio-culture such as songket cloth motifs as a learning resource (Arlianovita et al., 2015). Ethnoscience learning is essential to create a young generation with culture and science literacy (Dewi et al., 2019; Khery et al., 2021; Sudarmin et al., 2019), and building a conservation attitude (Kasa, 2011; Sudarmin & Sumarni, 2018).

Respondents explained that ethnoscience-based learning is important to develop as an effort to typical songket cloth of Sasak tribe conservation. This corresponds to the opinion of (Sudarmin, 2014) that ethnoscience learning is essential for cultural values conservation. According to (Purnamasari et al., 2021), ethnoscience learning is effective for integrating cultural values in science learning. Ethnoscience-based learning is important to build an attitude of cultural concern, local wisdom, and an attitude of tolerance for the cultural diversity of each region, and the development of regional potential (Akmal et al., 2021; Khery et al., 2021; Parrish & Linder-vanberschot, 2010; Wahyu, 2017). (Mardianti et al., 2020) explained that ethnoscience approaches can fortify students from the acculturation of foreign cultures that is transformed massively by electronic media in today’s digital age. The ethnoscience approach is effective for exploring procedural knowledge of cultural values (Chiappetta & Koballa, 2006; Listyawati, 2012; Wahyu, 2017). The application of indigenous science of songket cloth motifs in science learning has the potential to strengthen students science literacy and cultural concern (Arlianovita et al., 2015; Pertiwi & Firdausi, 2019).

Conclusion

Based on the results of the study, it can be concluded that that (1) perception of prospective science teachers has an average score in the "Good" category in terms of gender, regional origin, and study program; (2) there were no significant differences in the perceptions in male and female prospective science teacher based on t-test significance value of 0.455 > 0.05; (3) there were no significant difference in prospective science teacher’s perception refer to origin (native Lombok and non-native) based on t test significance value of 0.466 > 0.05; (4) there were no significant difference in the perception of prospective science teachers in the biology, chemistry, and physics education study program based on Anova’s significance value of 0.423 > 0.05.

Acknowledgements

The research entitled “Ethnoscience Studies in Songket Sasak Cloth Motifs: Prospective Science Teacher Perceptions” could be completed by having contributions from many other parties. In particular, we would like to thank to (1) the dean of FSTT, Universitas Pendidikan Mandalika; (2) Students of Biology Education, Chemistry Education, and Physic Education as the research respondents.

References


Sudarmin. (2014). Pendidikan karakter, etnosains dan
kearifan lokal (edisi pertama). Fakultas Matematika dan Ilmu Pengetahuan Alam Universitas Negeri Semarang.


