

# **ETHNOSCIENCE STUDY OF CORN FIELD AS A THEMATIC SCIENCE LEARNING RESOURCE**

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**Abstract.** Ethnoscience based learning in Elementary Schools is an effort to cultivate the value of local wisdom. This can be created when a lesson plan is developed. The development of these lesson plans can be developed with a modified 4D development model (without disseminate). One of the initial steps is needs analysis. This study aims to analyze the need to fulfill the definition phase. The stage aims to design learning devices that are able to link the existing curriculum in elementary schools with the concept of the ethnic that will be included in the learning material. This stage was carried out by exploring corn fields in Pamekasan, interviewing corn farmers in Pamekasan, curriculum analysis, analysis of student characteristics, and literature review. This research was analyzed using a qualitative approach. Based on the exploration results, 10 topics can be used for device development. Just selected two topics that are most effectively used as topics in the development of learning material.

## **1. Introduction**

The 2013 curriculum that has been implemented is the result of improvements from the previous KTSP curriculum. This curriculum changes some concepts of learning. One of them is the contents of learning material that is packaged in a theme. This theme-based learning is expected to be more meaningful for elementary school students. Based on student development in elementary schools, learning in elementary schools should be linked to concrete and close objects in the lives, knowledge, and experiences of students [1]. The most appropriate learning in this case is thematic learning.

This is consistent with the opinion of Aji [2] that the curriculum in elementary schools must be holistically based on science (natural, social, and cultural). Students can observe directly and can be involved in learning through ethno-experience. In this case, students will be easier to identify, explain scientifically, and inferently. Cultural knowledge is not only related to local wisdom but also about the philosophy of social life. This effort will foster the values of cultured characters and in accordance with noble values.

According to Widyaningrum [3] Quality of learning is an appropriate mix between teachers, students, material, learning conditions, and media to create an optimal learning process and learning outcomes in accordance with learning objectives. In general, indicators of quality learning can be seen, among others, from teacher learning behavior, teacher behavior and impact of student learning, learning conditions, learning materials, and learning media.

The results of the research are condemned by Mahendrani and Sudarmin thematic learning problems in elementary school are not only in terms of implementation, but also in planning and learning media. Thematic learning plans are needed in the form of teaching materials and media that are based on local potential and the culture in which the student lives [4].

The government has developed learning resources in the form of thematic books used at the national scale. In the thematic book has presented the life of the community with its culture, but this doesn't answer the demands of meaningful learning. This problem arises due to the books developed by the government covering the culture, environment, and life of various regions in Indonesia. so that students feel alienated and far from their lives. Such as staple food, livelihood, environment, and culture of the Pamekasan Madura community will be different from the people of Maluku or Papua. In applying the 2013 curriculum it was identified that learning in schools emphasizes aspects of the learning experience that are in accordance with the interests and talents of students. Seeing that the characteristics of students in each region in Indonesia differ from one another, it is necessary to identify the elements of local culture (local wisdom) in student learning resources to make active classes in order to achieve meaningful learning experiences [11]. Based on this, it is necessary to explore the conduct of needs analysis in the early stages of developing an ethnoscience learning plan.

Pamekasan area is an area that has a large corn field area of 40,272 hectares in 2013 [5]. Especially Baturmarmar and Palengaan Pamekasan areas. This enormous potential needs to be explored so that it can be used in thematic learning and natural laboratories in elementary school learning. Through an exploratory study of corn fields and the lives of Pamekasan corn farmers, ethnology and local wisdom concepts can be obtained that can be applied in learning. Learning based on local wisdom is very important to be implemented to present contextual learning and students' critical thinking skills [6]. Exploration of community science knowledge (Indigenous knowledge) can be made as a source of science concepts that seem old-fashioned as ancestral inheritance can become responsible scientific knowledge [7]. The development of teaching materials integrated with natural laboratories is very effective in improving student learning outcomes. This is evidenced from research by Mahendrani and Sudarmin, which states that the development of ethnoscience teaching materials with the theme of ecosystems can improve student learning outcomes [4]. Research results by researchers related to ethnoscience studies have been conducted in 2018 by taking salt as an object of research. The results showed that a lot of potential could be inspired and used as learning material in the form of Student Worksheets using the experimental method.

This study is needed to identify the ethnics of corn farmers and explore the potential of local community knowledge and the potential of corn fields related to science concepts. Local community knowledge (corn farmers) is not only an ancient heritage of knowledge but can have a value of scientific knowledge that can be accounted for. Through this research, it is hoped that the knowledge of local communities and corn fields can be utilized and function as an open science learning laboratory to introduce students to science experiments through experiential learning models so that scientific knowledge is contextual and relevant to the lives of the people around them. After the data and information are collected, it will be systematically compiled as a source of information in the book of 2013 curriculum based on ethnoscience with the theme of "my village corn field " integrated with the natural laboratory of corn fields. In addition, the results of the theoretical decryption will be used as a basis in the development of ethnoscience based thematic learning plans in which there are interactive multimedia learning media that are relevant to the lives of surrounding students. Based on this, this study aims to (1) map material in accordance with the ethnoscience of corn farmers Pamekasan and (2) explore corn fields as the main learning resource.

## **2. Research methods**

This research is an early stage development research, so this research focuses on the exploration study of the needs analysis of the development of ethnology-based learning plan. The research location is in the Palengaan area of Pamekasan Madura, and Baturmarmar Pamekasan Madura. Exploration studies

were carried out on corn fields and corn farmers in Palengaan Pamekasan Madura, and Batumarmar Pamekasan Madura. Data collection techniques for this research were carried out by exploring corn fields in Pamekasan, interviewing corn farmers in Pamekasan, curriculum analysis, analysis of student characteristics, and literature review. This research data is in the form of qualitative data. Data analysis was carried out using descriptive qualitative data analysis. In this study, researchers limited the study of ethnology to only the mouth associated with corn fields and farmer procedures for growing corn.

### 3. Results and Discussion

Elementary learning must be holistically conceptualized. Learning of an object can also be seen from the other side which will bring out the creativity of students. There are so many corners of the field that can be applied to various subjects with only one object of learning. This is a major component needed in the development of learning frameworks in applying the 2013 curriculum. It also can train students to become creative individuals and can solve problems in everyday life. Ethnoscience is a way that is designed for the creation of learning that integrates culture as part of the science learning process. Whereas Sukra, Subagia, and Suastra state that ethnoscience is some knowledge in a society that is traditional and hereditary [8]. The question asked to farmers in the interview activity is the question of how to cultivate corn and what are the obstacles in its cultivation. The following are the data from the interviews conducted.

**Table 1.** Corn Farmer Interview Result Data

No.	Question	The answer
1	What kind of corn is planted in this field?	Hybrid maize and partly grow local types of corn
2	What is the reason why farmers choose hybrid corn?	This type of hybrid corn has high productivity
3	What is the reason for the farmers to choose local types of corn?	<ol style="list-style-type: none"> <li>1. Spacing and harvesting of local corn are shorter than hybrid corn</li> <li>2. More resistant to water shortages</li> <li>3. More durable if stored after harvest</li> <li>4. Cheaper seeds</li> </ol>
4	What is the process of planting corn that has been done by farmers?	<ol style="list-style-type: none"> <li>1. Land management</li> <li>2. Fertilization</li> <li>3. seed selection</li> <li>4. soaking corn kernels as seeds</li> <li>5. planting seeds given a distance of about 30 cm</li> <li>6. treatment (watering, fertilizing, and handling pest problems)</li> <li>7. harvesting and threshing corn kernels</li> <li>8. post-harvest handling</li> <li>9. marketing</li> </ol>
5	Is there land planted with other plants?	<ol style="list-style-type: none"> <li>1. Some land is sometimes planted with rice during the rainy season</li> <li>2. Some land is often planted with tobacco during long droughts.</li> <li>3. Some lands are planted with "intercropping" systems</li> </ol>
6	What are the obstacles in the cultivation of corn plants	<ol style="list-style-type: none"> <li>1. The most common obstacle faced by farmers is the lack of water.</li> <li>2. Rat and caterpillar attack</li> <li>3. Shortage of fertilizer</li> </ol>
7	How to overcome obstacles faced	<ol style="list-style-type: none"> <li>1. Drilling wells by residents</li> <li>2. Pesticide spraying</li> <li>3. Utilization of natural fertilizers</li> </ol>

Based on the results of interviews, original knowledge data obtained from local corn farmers about technology and other matters relating to corn cultivation. This data can be linked to the elementary school curriculum so that potential material can be mapped that can be utilized as a learning resource. The following are the results of exploration and concept mapping on the results of exploration.

**Table 2.** The concept of the potential content of mathematics and science contained in local wisdom and corn field elements in elementary school

No	Local wisdom and elements of cornfield	The concept of IPA
1	There are various animals and plants in the corn field	Biodiversity, food chains, the shape of plants and animal parts as well as their functions, recognize types of animals based on food, adaptation, symbiosis
2	Corn growing season	The water cycle, the properties of light, the natural changes, the proliferation of living things, photosynthesis
3	Extermination of pests	The water cycle, the properties of light, the natural changes, the proliferation of living things, photosynthesis
4	Community staple food	Biodiversity, food chains, the shape of plants and animal parts as well as their functions, recognizing animal species based on their food, adaptation, symbiosis, the impact of human activities on environmental change, pollution
5	Mutual cooperation in planting corn	Digestive system, energy source
6	Formation of corn field bunds	Growth and development
7	Irrigating fields	Abrasion
8	Farmer's clothes	Water cycle
9	Tillage	Adaptation
10	Harvest	Growth and development

Students in the Palengaan and Batumarmar Pamekasan Madura area live in a corn farming environment. Although some of their parents do not work as farmers, they are familiar and close to the lives of corn farmers. The proximity of students to corn farming will provide students with preliminary knowledge about the supporting elements of agriculture, the process of planting corn until harvesting. So, by incorporating these elements into learning and adapted to the applicable curriculum.

Based on the table there are various potential findings to be arranged into learning. Based on the potential concept, certain elements will be selected that are most likely to be used and needed to develop meaningful learning for students. The development of the initial set of two topics were chosen as a potential for corn fields and the ethics of the local population, including "diversity of animals and plants in corn fields" and "staple food for corn rice". Both were chosen because they were considered to have a strong relationship with students' initial knowledge. In addition, the phenomenon found is easy to observe directly. The selection of these two topics is aimed at fostering the development of teaching materials. Following are the selected potential concepts that are compared with the basic competencies listed in the elementary school curriculum.

**Table 3.** Potential concepts in the elementary school curriculum

No.	Potential concept	Basic competence in the curriculum
1	Diversity of animals and plants in corn fields	in class four, namely 3.1 Explain the external shape of the animal and plant body and its functions, class five 3.2 Identify the plant parts and describe their functions, 3.6 Identify the types of animals from their food and describe the food chain in the ecosystem in the environment around, and sixth grade 3.7 Identify how living things adapt to the environment.
2	Corn staple food	Science in class five, namely 3.2 Recognize the organs of humans and animals and describe their functions.

Based on the results of the analysis above, a holistic learning tool can be developed so that students can interact directly with the environment as a learning resource. This interaction can hone students' process skills and make learning more meaningful. Learning that utilizes ethnoscience will be able to master scientific concepts with fun and be able to recognize local wisdom contained in the surrounding environment so that it is expected to be embedded in character that develops from the noble values of local wisdom. Learning with these themes will also provide a full learning experience. Based on student development theory, Students in elementary schools have concrete, integrative, and hierarchical thinking characteristics. Based on this ethnoscience, Science is very in accordance with the 2013 curriculum principles, namely 1) education based on national culture for better development, 2) students are the heirs of the nation's creative culture, 3) education is aimed at developing intellectual intelligence and academic rigor through disciplined education science, 4) education to build a better present and future life from the past with various intellectual abilities, communication skills, attitudes, social, caring, and participating for a better life of the people and nation.

Based on the analysis conducted by researchers by mapping potential phenomena as the basis of themes in ethnology-based learning can increase the ability of students to construct knowledge of the application of real knowledge in life. Student questions that have been appearing like this for what do I study this subject? Are there any implications for my real life later? "It will be overcome, so students will be motivated and feel important to learn that knowledge. In addition, learning with the chosen theme has a closeness to students' lives, so there is initial knowledge that can be used as a strong hook for new knowledge to be gained This is in accordance with research conducted by Zayyadi that learning should be in harmony with the specificity of the concept and development of students' thinking and important things in the material and usefulness in everyday life [9].

Utilization of this corn field will be very effectively used as a source of learning, because students are invited to participate actively and directly in contact with nature in innovative learning. This kind of learning is not only concerned with the cognitive realm. Students will make observations using all the senses that are possible, so that the psychomotor development of students will be more honored than just learning in class. After making observations, students are asked to present their findings. In this learning activity students can hone their social skills which are the affective domain. This learning is in accordance with the opinion of Literature which states that there are many aspects of science that can be linked to local culture, science learning can explore local culture that can be packaged in research activities, field observations, and discussions, in addition to learning resources that are in accordance with learning is the surrounding environment and social culture [10].

#### **4. Conclusions and suggestions**

Based on the results of exploration of the potential concepts of elementary school mathematics and science content contained in local wisdom and elements of the corn field obtained 10 elements that can be adjusted to the curriculum at elementary school. Based on the 10 elements, only 2 were chosen to represent the corn fields and the ethics of corn farmers in Pamekasan, namely "the diversity of animals and plants in the corn fields" and "staple food for corn rice". Utilization of ethnics and student

environment as the theme of learning and direct learning resources will increase the meaningfulness of ongoing learning.

Based on this research, there are suggestions that can be delivered, 1) other themes can be developed based on the results of exploration, 2) development with the realm of other subjects can also be developed based on the results of exploration.

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