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ETHNOSCIENCE APPROACH TO MEASURE CREATIVE THINKING SKILLS PROFILE

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ABSTRACT

The urgency of research on creative thinking skills as a requirement for 21st-century skills for low-category high school students. The purpose of the study was to determine the profile of creative thinking skills with an ethnoscience approach. The quantitative research method used quasi-experiments. The research sample was 3 high schools with different cultural backgrounds (SMA A: City Category, SMA B: Middle Category, SMA C: Village Category). Data collection used the Torrance Creative Thinking Test (TTCT) with 10 essay questions—descriptive analysis techniques to determine the process of science reconstruction and the profile of creative thinking skills. The results showed that there was a difference in the percentage of reconstruction and profile of middle-category students in SMA B, the highest at 75.11 compared to SMA A (City) at 75.02 and SMA C (Village) at 73.06. Differences in cultural background greatly influence efforts to understand science through meaningful learning resources of ethnoscience. This approach provides opportunities and perspectives for students to understand scientific issues that develop in society.

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1. INTRODUCTION

Science learning aims to form students' skills that can adapt to different conditions, think flexibly, think creatively, think critically, respect society, and be tolerant of ideas (Tendrita et al., 2016) which is in line with the independent curriculum. However, creative thinking skills are still low due to the difficulty of teachers in determining learning strategies and utilizing the surrounding environment as a form of preserving local wisdom that needs to be improved (Khoiri et al., 2023). The preservation of culture and customs inherent in a region seems to be disappearing along with the flow of modernization. The a need to create a learning environment to overcome this, one of which is through students' creative thinking skills which have not been overcome. Therefore, the form of approach that can be taken is to provide opportunities for students to think creatively through an ethnoscience approach.

The reason is that ethnoscience can appreciate students and improve the science process (Khoiri et al., 2023), learning outcomes (Okwara & Upu, 2017), and science knowledge sains

(Rozi et al., 2021). The use of ethnoscience studies to master science concepts and appreciate community traditions and culture is urgently needed. One form of creative thinking opportunity can be raised through local potential issues that are close to students' lives. Thinking more openly and flexibly in reconstructing the original science of the community into scientific science requires complex and meaningful learning resources.

Creating an environment through an ethnoscience learning approach oriented to strategic environmental resources with student (Derman & Gurbuz, 2018; Fischer et al., 2015; Khoiri et al., 2022a). Thinking activities and preserving cultural diversity, traditions, and local wisdom are increasingly eroded by the flow of globalization (Peters & Jandrić, 2017; Schröder, 2019). Social behavior is shifting more and more marked by the role of humans being replaced by sophisticated digitalization systems (Khoiri et al., 2019), so it is important to design learning in the global era that meets competitive education graduates (Sukawi et al., 2021), but still upholds cultural traditions (Khoiri A & Sunarno W, 2019; Khoiri et al., 2021). So that the use of information technology-based learning is integrated with social issues based on meaningful local wisdom.

The results of observations on the use of local wisdom in high school science learning in Wonosobo Regency were 67%. This also requires further research on the cultural background of students and schools in reconstructing student science. The facts found are that high school students have not been able to recognize the local potential of their region, lack of concern for the surrounding environment, and apathy towards preserving the culture of the community. This is These educational findings highlight the urgent need for innovative strategies that integrate cultural heritage into science learning. Apathy towards the local wisdom of the region is a trigger for the erosion of traditions and cultures that are increasingly evident due to the flow of globalization.

The importance of preserving local potential, customs, and culture is listed in the ethnoscience approach as an effort to empower students' character. In addition, teachers know the local potential and culture of the community, but only 40% of teachers can utilize it in science problems and have not been utilized in empowering students' creative ideas. The urgency of innovation in the ethnoscience approach as one solution to overcome the problem of students' creative thinking skills. Based on the research problem, the purpose of the study is to analyze the profile of student's creative thinking skills through the reconstruction process in the ethnoscience approach.

2. METHOD

Quantitative research method with quasi-experiment type one group post test design. The research sample used 3 classes in 3 different high schools (SMA A: City, SMA B: Madya, SMA C: Village). A purposive sampling technique was used based on different school cultural backgrounds. The sampling technique uses purposive sampling based on differences in school cultural backgrounds. The sample criteria include: The school's cultural background is assumed to be geographically located by categorizing 3 types of schools (City, Middle and Village). The reason is that geographical location will affect the environment and culture of students where they go to school. Furthermore, to identify the profile of students' creative thinking skills through 5 indicators, namely Fluency (X1), Flexibility (X2), Originality (X3), Elaboration (X4), and Redefinition (X5). Data collection using the Torrance Creative Thinking Test (TTCT) questions

as many as 10 essay questions, a standardized test used to measure students' creative thinking abilities. This test consists of various activities involving verbal, and figural thinking ethnoscience. as well as documentation of science reconstruction using an ethnoscience approach. Descriptive data analysis techniques by determining profiles based on the percentage of reconstruction obtained from the results of science learning. The research procedures carried out are presented in Figure 1.

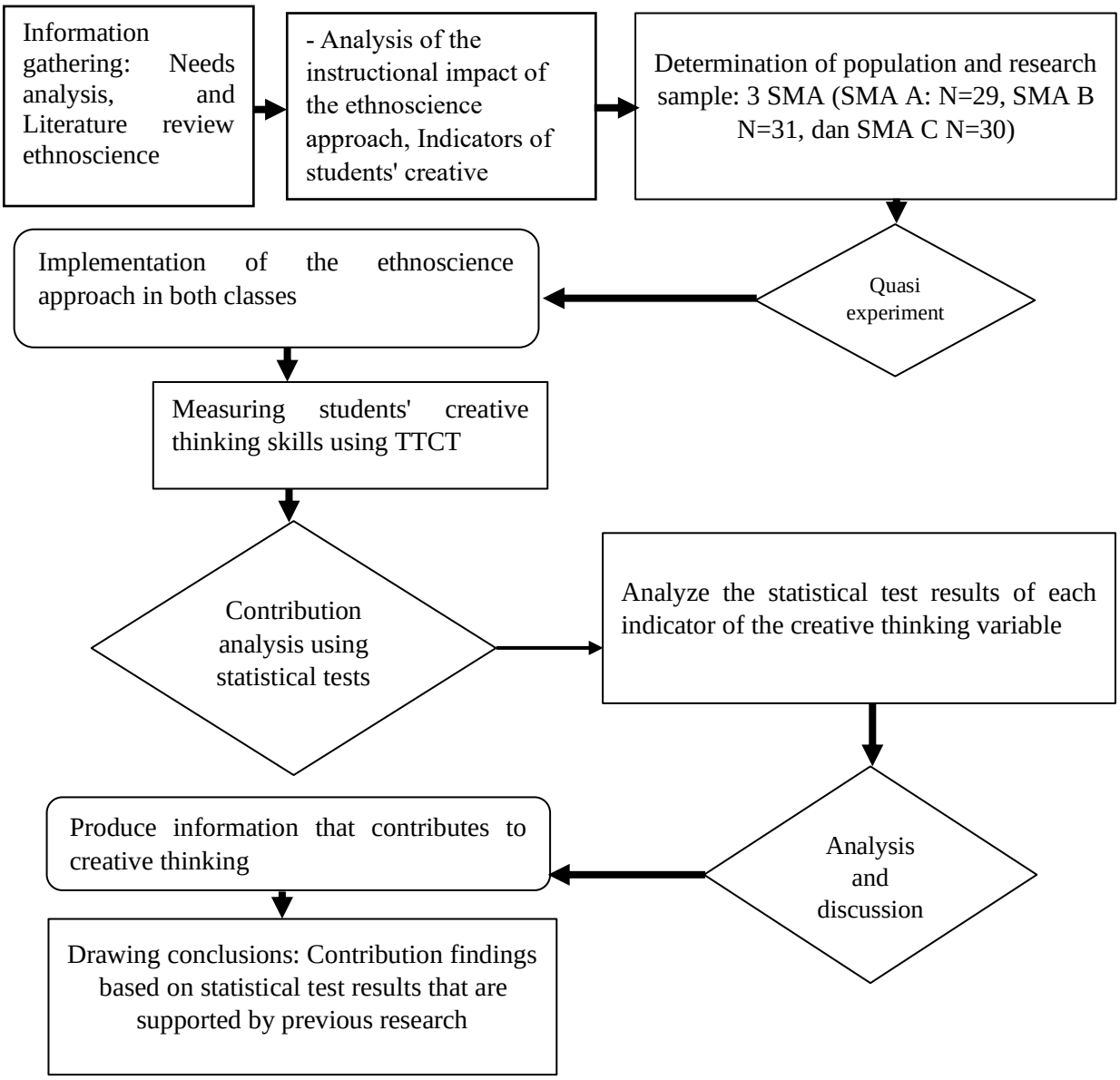

Figure 1. Research Procedure

3. RESULTS AND DISCUSSION

The results of the science reconstruction mapping of students in each category of SMA A (city), SMA B (middle), SMA C (village) are presented in Tables 1, 2, and 3.

Table 1. Reconstruction of science in high school A category city

Category	Class A	Class B	Class C	Average
PS (Potential Scientist Student)	69,4%	39,4%	0,0%	36,3%
OSK (Other Smart Kids)	25,0%	48,5%	40,9%	38,1%
IDKS (I don't Know Student	5,6%	12,1%	59,1%	25,6%
OS (Outsider)	0,0%	0,0%	0,0%	0,0%
IOS (Inside Outsider)	0,0%	0,0%	0,0%	0,0%
Sum	100,0%	100,0%	100,0%	100,0%

Table 2. Reconstruction of science in high school B category madya

Category	Class A	Class B	Class C	Average
PS (Potential Scientist Student)	25,0%	44,4%	37,5%	35,6%
OSK (Other Smart Kids)	62,5%	51,9%	34,4%	49,6%
IDKS (I don't Know Student)	9,4%	3,7%	21,9%	11,7%
OS (Outsider)	3,1%	0,0%	6,2%	3,1%
IOS (Inside Outsider)	0,0%	0,0%	0,0%	0,0%
Sum	100,0%	100,0%	100,0%	100,0%

Table 3. Reconstruction of science in high school C category village

Category	Class A	Class B	Class C	Average
PS (Potential Scientist Student)	39,1%	73,5%	0,0%	37,5%
OSK (Other Smart Kids)	47,9%	14,7%	9,0%	23,9%
IDKS (I don't Know Student	13,0%	11,8%	45,5%	23,4%
OS (Outsider)	0,0%	0,0%	45,5%	15,2%
IOS (Inside Outsider)	0,0%	0,0%	0,0%	0,0%
Sum	100,0%	100,0%	100,0%	100,0%

The mapping of students' science reconstruction is divided into 5 categories (PS, OSK, IDKS, OS, and IOS) which indicate the level of ability in reconstructing science, the lower the level. For schools in the city category, the highest reconstruction mapping is in the OSK category of 38.1% and the lowest is in the IDKS category of 25.6%. Schools in the Madya category have the highest mapping in the OSK category of 49.6% and the lowest in the OS category of 3.1%. Schools in the village category have the highest reconstruction mapping in the PS category of 37.5% and the lowest OS of 15.2%. Based on these results, the highest level of reconstruction in the PS (Potential Scientist Student) category was obtained in SMA C (village), namely students easily understand cultural traditions as science. while in the next category, namely OSK (Other Smart Kids), students need adaptation in understanding traditions and culture, but can still learn to understand science, obtained in SMA B (madya). The highest IDKS (I don't Know Student) category is in SMA A (City), students find it difficult to understand their own traditions and culture by 25.6%, the highest OS (Outsider) category is 15.2% in SMA C (village), students find it very difficult and do not recognize and understand traditions and culture, so they are unable to understand science as a whole. While in the IOS (Inside Outsider) category, none of the schools are at this lowest level. These results show that the reconstruction efforts carried out by students are very diverse, depending on their perspective and thinking, they can understand the culture as

a whole in learning science. Environmental factors and creative thinking are very important in determining students' efforts to restore.

The creative thinking skills profile was obtained based on the test results after implementing learning with the ethnoscience approach strategy presented in Figure 2.

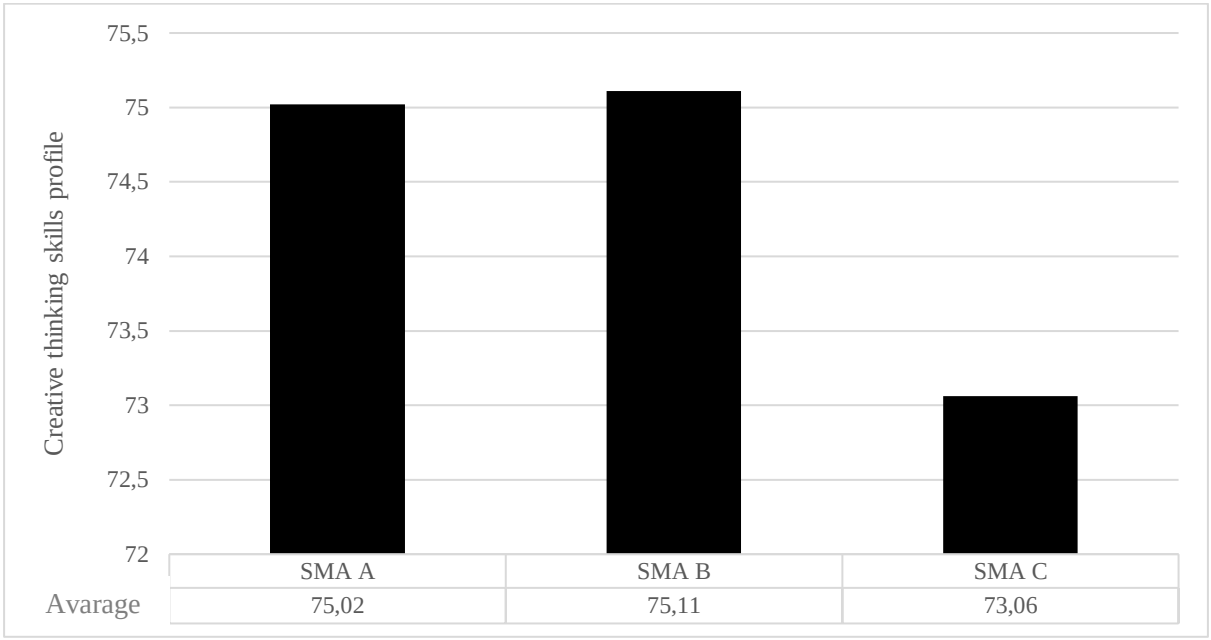

Figure 2. Creative thinking profile

The Figure 2, average profile of creative thinking skills for each school category is SMA B (junior high school) has the highest average compared to SMA A (city) and SMA C (village), but when viewed based on the reconstruction mapping of student efforts, SMA C (village) has the highest level. This means that the reconstruction mapping of science does not always reflect creative thinking skills significantly, but there are other factors that are not studied such as the level of environmental concern and positive responses to surrounding traditions and cultures. The influence of the environment and the flow of globalization between students in cities, junior high schools, and villages have differences and readiness to learn. Students feel more in control of the concepts learned after linking the material to social issues in society (ethnoscience). The ethnoscience approach always confronts students with complex learning problems to solve problems creatively, this is in line with Wallas' statement that one of the requirements for someone to be able to think creatively is to get out of their ego, get out of their comfort zone (out of the box) so that students can think fluently, flexibly and can find new ideas (originality) as evidence that students have been able to improve their creative thinking skills.

Students' responses to science learning using an ethnoscience approach are: 1) there is something new in the presentation of learning resources that combine traditions, culture, and local potential of the Wonosobo area with science materials, 2) students gain new experiences and knowledge in constructing community knowledge into scientific knowledge that has never been done before, 3) the ethnoscience approach is fun and makes it easier for students to understand science concepts, 4) the ethnoscience approach can increase students' and society's environmental awareness, and 5) improve students' creative thinking skills.

Learning for well-being is an important aspect of student responses that determine the quality of learning. The ethnoscience approach provides students with intellectual freedom in

overcoming learning difficulties that do not make students stressed and damage their cognitive structure. Students develop creative thinking skills and environmental care attitudes for social interaction and other self-development. The concept of student well-being in the ethnoscience approach is reflected in the benefits of positive attitudes and care for students' lives and environments. Fanaticism towards community traditions and cultures is increasing through ethnoscience studies that are exploratory in nature (Mónus, 2019; Punzalan, 2020; Satria et al., 2024). Learning to use an ethnoscience approach as a permanent change in behavior, knowledge, and creative thinking skills becomes a valuable experience for students.

The achievement of students' creative thinking increased after using the ethnoscience approach. The results show that environmental learning resources with an ethnoscience approach are able to accommodate students' creative thinking habits. The indicator of formulating ideas in solving problems is part of creative thinking skills to analyze scientific phenomena through ethnoscience studies developed in science learning (Diki, 2014; Khoiri & Haryanto, 2018; Khoiri, 2020). Controversial issues are an important factor in designing ideas to find solutions to problems they experience so that students' creative thinking and positive attitudes toward the environment can be improved. Creative ideas emerge through the learning discovery process that provides students with the opportunity to explore sources of information. Strategic sources of information on environmental issues make learning more meaningful and contextual. Ethnoscience as a nuance of learning equips students with the knowledge and character to appreciate regional culture.

The characteristics of the ethnoscience approach focus on developing students' creative thinking skills through inquiry learning settings. Students are given information about ethnoscience in class so that they will better understand its potential, traditions, and culture (Kashyap & Mathew, 2017; Sumarni et al., 2017; Tresnawati et al., 2020). Ethnoscience is used in class as an applicable and independent learning resource. Student activities train students' creative thinking skills. The ethnoscience approach can develop the performance of creative thinking skills as indicated by differences in students' creative thinking skills. The use of ethnoscience can foster students' creative thinking skills toward the surrounding environment and can train students' independence in learning (Reksiana, 2019; Sudarmin & Sumarni, 2018; Sumarni & Kadarwati, 2020). Ethnoscience-based teaching materials can provide good feedback or responses to students' work.

Learning success can be identified from students' creative thinking skills in interacting with other friends through the presentation and presentation of theories appropriately and systematically, conveying ideas clearly and easily to achieve learning objectives. Linking science problems with ethnoscience provides information to be used for students' creative ideas. If students' abilities in analyzing, evaluating, and creating are good, it means that the students have understood the content or concepts being studied. Logically, students will not be able to communicate if they do not know what to convey. There is a positive response as an indicator of motivation that is explored through teaching materials presented by providing ethnoscience information, and science problems that utilize ethnoscience. Activities provide attention, interest, and concern for students to find solutions in learning science concepts. An important component in learning is motivation in the form of psychological encouragement for students that can change the situation for the better.

Science learning has long-term hope for the survival of students when they utilize all the local potential and ethnoscience that they have to then be utilized optimally (Setiawan et al., 2017).

Ethnoscience-based learning is a process of forming and designing a learning environment that has a nuance of tradition and culture. The results of the study confirmed that the way to improve creative thinking skills using an inquiry learning approach is in accordance with the characteristics of 21st century education (Khoiri et al., 2022b, 2024).

The role of ethnoscience in reconstructing because contextual learning provides students with an understanding of science and can be implemented in real life. The integration of students with the environment can be realized if learning is oriented towards the surrounding environment that is studied meaningfully. So that students can establish reciprocal relationships with the surrounding environment, students can recognize and understand the local potential of their area, so that the sustainability of the regional environment becomes an important factor in learning with ethnoscience. The characteristics of the ethnoscience approach in constructing as a form of strategy and design of learning experiences by creating a cultural and traditional environment that is integrated in the learning process (Satria et al., 2024; Sudarmin et al., 2020; Wirama et al., 2023). The results of human creativity and initiative are developed as indigenous knowledge and can be transformed into formal science. The term ethnoscience can be studied in traditional ecological knowledge, Indigenous Science, local culture, and local wisdom.

4. CONCLUSION

The profile of students' creative thinking skills in each school is different, in the middle category of SMA B, the creative thinking skills score is the highest at 75.11 compared to SMA A (City) at 75.02 and SMA C (Village) at 73.06. These results indicate differences in how to reconstruct science based on students' cultural backgrounds. The ethnoscience approach can provide a direct instructional learning impact on students' creative thinking skills. Introduction to tradition and culture can provide opportunities to think more flexibly and originally because the learning resources used are based on students' direct life experiences.

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