Student Responses to the Multicultural-Based Ethno-STEAM Learning Model

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Abstract. The purpose of writing this article is to determine the practicality of the mul-ticultural-based Ethno-STEAM learning model that has been developed in terms of the responses given by students. Responses measured include eth-no-STEAM and multicultural. The type of research used is research and de-velopment (RnD). The research stages refer to the Borg and Gall model. The research instrument was a questionnaire and was given to class VII students. The results showed an average score of 77.4%, which means that students gave a positive response to the learning model. The responses given by stu-dents include getting to know and appreciate cultural heritage better through exploring science, technology and art, respecting each member of the group and helping them if they experience difficulties, and being able to develop multicultural values, namely democratic, pluralist and humanist through col-laborative work. The results of this study indicate that students are interested in learning science material that is integrated with culture, helps students de-velop innovative solutions in problem solving, and respects any differences that arise when working in teams.

Keywords: Learning Model, Multicultural-Based Ethno-STEAM, Student Response

Introduction

Science learning in the 21st century is learner-centered by providing opportunities to learn independently to acquire new knowledge and skills needed to deal with changes [1]. The opportunity to learn independently requires learners to organize their own learning, plan, and monitor learning independently in a new context [2]. The success of learning is influenced using appropriate learning strategies. The use of effective learning strategies is important to achieve optimal learning outcomes. The focus of the selection and use of learning strategies is the integration of material and the development of key skills that can be transferred to lifelong learning and include reflective practice, critical thinking, and systematic [3]. So that learners will be able to identify, understand,

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and solve complex problems from a multi-disciplinary perspective [4]. Mastery of adequate knowledge and skills gives more value to the quality of a person.

Learning activities are innovatively designed to activate learners in building knowledge and developing skills. The focus in learning is the mastery of 21st century skills as preparation for the world of work [5]. 21st century skills integrate knowledge, skills, attitudes, and mastery of ICT. Based on the observation, it is known that learning activities have not been centered on students. The learning process is carried out by listening to the teacher's explanation while taking notes, conducting discussions and questions and answers, learning in groups, summarizing the material, and doing exercise questions contained in the textbook or student worksheet. According to [6] that the same and repetitive learning process will make students only can accommodate information without thinking critically and creatively.

Another problem faced is the absence of local culture integration in science learning. Teachers have never integrated local culture due to time efficiency. Integrating local culture requires preparation starting from identifying local cultures that are in accordance with science concepts, reconstructing local knowledge in Western science, and creating learning resources that contain local culture. The absence of local culture content results in students not being able to understand the meaning of science contained in the traditional ceremonies they often perform. This condition is like research [7] that science lessons in schools lack local culture in the local area, educators lack understanding of the meaning of science in local culture so that it is difficult to connect teaching materials with scientific values of local culture, low knowledge of students about local culture, and students' understanding of natural phenomena becomes meaningless. Based on these problems, the solution is to develop a multicultural-based Etno-STEAM learning model.

Multiculture-based ethno-STEAM is a learning model that combines STEAM with local cultural contexts that contain science concepts or called ethnoscience [8] based on the cultural diversity of learners to develop critical, creative, innovative, and collaborative thinking skills [9]. In multicultural-based Ethno-STEAM, learning activities are designed through the presentation of authentic problems related to ethnoscience, based on the cultural diversity of learners, and structured tasks that can encourage learners to solve problems or complete tasks by integrating various disciplines in groups. The multicultural-based Etno-STEAM learning model aims to teach awareness of local culture, the problem-solving process by considering the cultural diversity of learners, and a positive attitude towards science. Multicultural integration in Etno-STEAM is based on five dimensions of multicultural education, namely: 1) content integration, 2) knowledge construction, 3) prejudice reduction, 4) equity pedagogy, and 5) empowering school culture.

The purpose of writing this article is to determine the practicality of the multicultural-based Ethno-STEAM learning model that has been developed in terms of the responses given by students. Response is a response or reaction given by learners to the learning process experienced. The response can show students' understanding, interest, motivation, and involvement in learning.

2 Method

The type of research used is research and development (R&D) by skip the third first step. The research stages refer to the Borg n Gall model. The stages of Borg n Gall to determine the practicality of the multicultural-based Etno-STEAM learning model are 4) preliminary field testing, 6) main field testing, and 8) operational field testing. The preliminary field testing was applied to a small class with the number of students was 10. Main field testing in one class with the number of students was 27. Operational field testing in experimental and control classes with the number of each class was 27 students. The research instrument used was a questionnaire. The components of the questionnaire are ethnoscience, STEAM, and multicultural (Table 1).

Table 1. Components of the questionnaire.

Indicators	Sub-indicators	Description
Ethnoscience and STEAM	Curiosity	Desire to learn Ethno-STEAM
	Ability	Learners' proficiency in mastering materials and completing tasks
	Usability	Benefits gained after learning about Ethno-STEAM
Multicultural	Pluralist	Understand, appreciate, and respect cultural differences
	Democratic	Expressing opinions without offending others, recognising diversity, and providing equal opportunities
	Humanist	Demonstrate empathy regardless of cultural differences.
	Problem solving	Solve problems and make decisions in situations involving cultural differences.
	Interaction and cooperation	Interact and co-operate with learners from different cultural backgrounds

The data obtained were analyzed using descriptive statistics using equation 1.

$$P = \frac{x}{\sum x} \times 100\% \quad (1)$$

where P is percentage, x is the number of responses given by students; and $\sum x$ is maximum number of responses. Criteria for student responses to the learning model are shown in Table 2.

Table 2. Criteria for student responses to the learning model.

No	Score range	Description
1	76%– 100%	Very good, very positive response to the learning model
2	51% – 75%	Good, positive response to the learning model
3	26% – 50%	Quite good, positive response to the learning model
4	0 – 25%	Not good, negative response to the learning model

3 Results and Discussion

Student response can be interpreted as a response, reaction, or feedback given by students after participating in learning or completing a task. Responses from students provide information to teachers about how students feel and understand the material that has been taught. The results of student responses can be used to improve the subsequent learning process. In this research, students responded to the learning model they had followed. Student response data was obtained through three trials, namely preliminary field testing, main field testing, and operational field testing as seen in Table 3.

Table 3. Results of analysis of student responses.

	Preliminary field testing	Main field testing	Operational field testing
Percentage of student responses	78.6%	72.7%	81%

The percentage in preliminary field testing was 78.6% with very positive criteria. The highest response shown by students was to become more familiar with and appreciate cultural heritage through exploration of science, technology and art. Another benefit obtained is that students can understand their social and cultural roles in producing scientific knowledge, developing attitudes towards science, and maintaining local cultural wisdom values [10]. The integration of local culture in learning provides a holistic learning framework. Students can learn traditional knowledge and skills that are relevant to today's life for survival because traditional knowledge is obtained from observations and interactions with the environment over a long period of time [11] and is related to survival issues such as medicine, food technology, and climate change [12]. The second highest response shown by students was being more able to respect each group member and help them if they experienced difficulties.

The percentage in main field testing was 72.7% with positive criteria. Students begin to develop democratic, pluralist, and humanistic multicultural values in learning through respecting differences of opinion, feeling happy when given the opportunity to participate in decision making, and helping friends when experiencing difficulties. Students develop multicultural values, namely democratic, pluralist and humanist through collaborative work. Learning activities are carried out in groups to complete tasks/problems that require collaboration between students. Group learning provides students with the opportunity to share ideas, listen to other people's opinions, overcome differences of opinion, practice how to communicate effectively, understand other people's feelings and views, help each other in solving problems from different points of view, mutually explain and teach concepts to peers who do not understand, and increase active participation in learning.

The percentage in operational field testing was 81% with very positive criteria. Students are interested in studying science when it is integrated with culture. Cultural integration in science helps students understand science teaching material and can connect science concepts with the traditions or culture around them. Assignments carried out collaboratively provide opportunities for students to interact more with peers, develop mutual respect for differences of opinion, and produce varied problem solutions. Students realize that collaborative activities can increase creativity.

4 Conclusion

Students respond positively to the multicultural-based Ethno-STEAM learning model. The responses given by students include getting to know and appreciate cultural heritage better through exploring science, technology, and art, respecting each member of the group and helping them if they experience difficulties, and being able to develop multicultural values, namely democratic, pluralist and humanist through collaborative work.

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