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Application of Collaborative Cultural Maps to Improve Critical Thinking Skills

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Abstract
Critical and collaborative thinking skills are essential 21st-century competencies for learners in facing global challenges. Unfortunately, the learning of Natural and Social Sciences (IPAS) in elementary schools is still dominated by the rote approach, without encouraging understanding of the meaning of local cultural values. This research aims to apply the Collaborative Cultural Map model to improve the critical and collaborative thinking skills of grade IV students. The research uses the Kemmis and McTaggart model Class Action Research (PTK) approach which was carried out in two cycles at Sekolah Dasar Negeri 10 Malang in the even semester of 2024/2025, with 27 students. Data was collected through observation, pre-post tests, interviews, and documentation, then analyzed descriptively, quantitatively, and qualitatively. The results showed an increase in students' learning completeness from 74.07% in the pre-cycle to 88.89% in the first cycle, and reached 100% in the second cycle, with an average final score of 93.33. In addition to academic improvement, this model encourages active participation, effective communication, and better social interaction in the classroom. These findings prove that collaborative learning based on local culture effectively strengthens 21st century skills and makes an innovative contribution to the development of more contextual science learning models in primary schools.

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Introduction

In an era of globalization marked by rapid technological developments and cultural exchanges, education is required to develop 21st century skills, one of which is collaborative skills and critical thinking. These skills are an important foundation in shaping learners who are able to face complex challenges in the future. Trilling and Fadel (2009) stated that the modern learning system must encourage students to not only memorize information, but also understand concepts in depth and develop analytical thinking skills.

In the context of Natural and Social Sciences (IPAS) learning, understanding Indonesia's cultural diversity has a crucial role in building national identity and fostering awareness of multiculturalism in students. Unfortunately, the reality in the field shows that most students still learn culture through a memorization approach, such as remembering the name of a traditional house, without understanding the cultural values contained in it (Saputri & Hidayat, 2023). This shows the need to design more meaningful, interactive, and contextual learning.

A number of studies have shown that collaborative learning is effective in improving students' social skills as well as analytical abilities. Rahman (2021) stated that the application of a project-based learning model can encourage students to develop critical thinking skills through active involvement in problem solving. Meanwhile, Saputri and Hidayat (2023) prove that collaborative learning is able to strengthen social skills and critical thinking simultaneously in the elementary school environment.

Furthermore, collaboration skills not only strengthen the ability to work in a team, but also foster students' ability to resolve differences of opinion constructively. Trisnawati and Nugroho (2021) formulated several indicators of collaboration skills, including active participation in discussions, shared responsibility, effective communication, productive conflict resolution, and coordination of tasks in groups.

On the other hand, critical thinking skills are an essential need in the era of information flooding. According to Hasanah, Putri, and Hidayat (2022), critical thinking includes the ability to identify problems, analyze information, evaluate arguments, draw logical conclusions, and conduct self-reflection. Suciono (2021) added that this ability is indispensable for filtering valid information and making informed decisions based on evidence.

Based on this background, this research was conducted to apply a learning strategy based on the Collaborative Cultural Map in the learning of science in grade IV. This approach aims to improve students' critical and collaborative thinking skills through cultural mapping activities that are carried out in an interactive and reflective manner. Through the implementation of this strategy, it is hoped that students will not only recognize the cultural richness of the archipelago, but also be able to understand the relationship between culture, geographical environment, and social values that shape the nation's identity. Thus, this research contributes to developing more collaborative learning practices, and is based on strengthening high-level thinking skills.

Method

This study employs a Classroom Action Research (CAR) design based on the Kemmis and McTaggart (2014) model, conducted in two cycles, each comprising the stages of planning, action implementation, observation, and reflection. The research focuses on enhancing

students' critical and collaborative thinking skills through the application of a collaborative cultural map model in grade IV Natural and Social Sciences (IPAS) learning. The action variable involves mapping Indonesian cultural diversity in groups, with critical thinking skills measured by indicators of identifying cultural information, analyzing cultural differences and similarities, deducing cultural values, and evaluating socio-cultural impacts. Collaborative skills are assessed through indicators of active participation, shared decision-making, effective communication, and group responsibility. The research was conducted at SD Negeri Kebonsari 4 Malang (pseudonymized for research ethics) during the even semester of the 2024/2025 academic year, specifically from March to May 2025, involving 27 purposively selected grade IV students whose characteristics aligned with the cultural theme and basic collaborative skills identified through preliminary observations. Data collection instruments included: (1) student activity observation sheets, (2) pre-test and post-test instruments consisting of 10 multiple-choice questions (MOTS indicators) and 5 descriptive questions (HOTS indicators) designed based on Anderson and Krathwohl's (2001) revision of Bloom's Taxonomy and validated through expert judgment by two primary education lecturers, (3) semi-structured interview guidelines for classroom teachers, and (4) photo documentation of learning activities. Instrument validity was ensured through interrater reliability tests for observations and Pearson and Cronbach's Alpha tests for the test items. Data collection techniques encompassed direct classroom observations by the researcher and an assisting partner teacher, administration of written tests before and after each cycle, semi-structured interviews with classroom teachers post-action, and photo documentation of collaborative activities. The research procedure commenced with a pre-cycle to assess students' initial critical and collaborative thinking skills, followed by the first cycle where the collaborative cultural map model was implemented through group-based Nusantara cultural mapping activities. Reflections from the first cycle informed refinements for the second cycle, including structuring group tasks more evenly and integrating cultural video stimuli to initiate discussions. Data analysis involved quantitative descriptive comparisons—calculating class averages, learning completeness percentages, and gains from pre-test to post-test scores (with a Minimum Completeness Criteria of 75)—and qualitative analysis following Miles and Huberman's (2014) stages of data reduction, data display, and conclusion drawing. Data validity was ensured through methodological triangulation (tests, observations, interviews), source triangulation (students and teachers), member checking with partner teachers, and reflective discussions after each cycle's completion.

Results and Discussion

Results

This research aims to apply the Collaborative Cultural Map model in an effort to improve the collaborative skills and critical thinking of grade IV students in Natural and Social Sciences (IPAS) learning. The Pre-cycle stage was carried out to photograph the initial condition of collaborative skills and critical thinking of grade IV students before applying the Collaborative Cultural Map model. Data was collected through observation, pre-test, and interviews with classroom teachers. Observations show that students tend to learn individually, with low discussion participation and less effective communication between students. The habit of

choosing to work with friends who are considered smarter leads to inequality of collaboration in the group.

In the aspect of critical thinking, students memorize more traditional house names without understanding the cultural meaning they contain. They have difficulty in comparing cultures between regions analytically.

The pre-test provided contains 10 multiple-choice questions and 5 description questions, measuring indicators of middle order thinking skills (MOTS) and higher order thinking skills (HOTS). The average score of students in the pre-cycle is presented in Table 1.

Table 1. Results of pre-test students' critical thinking skills

Measured Aspects	Average Score (%)	Category
Understandingbasis about Indonesian culture	56%	Low
Ability to identify Traditional House	60%	Keep
Comparability culture (HOTS)	40%	Low
Critical thinking skills Overall	48%	Low

Interviews with classroom teachers reinforce this finding, that classroom learning methods tend to be teacher-centered with little active involvement of students.

Cycle I began with the implementation of the Collaborative Cultural Map through group activities. Students are instructed to map Indonesian culture based on the characteristics of their respective regions. Post-test results showed an improvement in critical thinking skills, although some students still had difficulty discussing effectively.

Reflections from cycle I are used to improve strategies in cycle II, including by a more structured division of group tasks. In cycle II, observations showed increased active participation, more effective communication, and better coordination of tasks between group members.

Table 2. A recap of the students' learning completeness

Cycle	Number of Students Completed	The Number of Students Is Incomplete	Grade Point Average	Percentage Completeness (%)
Pre-cycle	20	7	76,11	74,07%
Cycle I	24	3	80,37	88,89%
Cycle II	27	0	93,33	100%

The application of the Collaborative Cultural Map model has been proven to be effective in improving students' critical thinking and collaboration skills. Group-based learning and exploration of local cultures encourage students to not only memorize, but also analyze, compare, and draw conclusions about the diversity of cultures in Indonesia.

Discussion

Based on the results of the study, it shows that the application of the collaborative cultural map model is able to significantly improve the collaborative skills and critical thinking of grade IV students. The average score increased from 76.11 in the pre-cycle to 80.37 in the first cycle, and finally reached 93.33 in the second cycle, with the completion percentage increasing from 74.07% to 100%. These findings indicate that the use of collaboration-based learning and exploration of local cultures is effective in encouraging learners to be actively involved in the learning process.

The interpretation of these results shows that students' involvement in contextual group activities increases social interaction, shared responsibility, and effective communication skills, as stated by Trisnawati and Nugroho (2021). In collaborative-based learning, learners not only passively receive information, but also build meaning through discussion, negotiation, and exchange of ideas, which positively impacts their critical thinking skills.

The improvement of students' critical thinking skills is reflected in their progress in analyzing, evaluating, and comparing various cultures in Indonesia. These findings are in line with the results of the research of hasanah, putri, and hidayat (2022) which states that critical thinking skills can be significantly improved through problem-based learning models and collaboration. With a collaborative cultural map approach, students not only understand the diversity of Indonesian culture on the surface, but are also able to assess the relationship between culture, social values, and the geographical environment.

The integration of these findings in the structure of education science shows that project-based learning models, especially those that focus on local culture, can be an innovation in science learning. This research supports the argument of Rahman (2021) that project-based learning strengthens high-level thinking competencies, while enriching students' understanding of their social and cultural environment.

The novelty of this study lies in the use of a collaborative approach based on local culture as a means to improve critical thinking skills, which has not been widely studied in the context of social studies learning at the elementary school level. In addition, the application of collaborative cultural maps also modifies traditional collaborative learning theories by emphasizing the integration of cultural values in group activities, so that learning becomes more contextual and meaningful.

The theoretical implication of these findings is the need to develop collaborative learning models that are more adaptive to the local cultural context as a strategy to strengthen 21st century competencies. Meanwhile, practically, the results of this study provide recommendations to educators to adopt a collaborative project-based learning model to increase students' active participation, critical thinking skills, and cultural understanding.

This research also opens up opportunities for further studies that can explore the effectiveness of collaborative cultural maps in various other subjects, as well as examine their impact on the formation of intercultural character and tolerance attitudes.

Conclusion

Based on the results of the research, it can be concluded that the application of the collaborative cultural map model is effective in improving the critical and collaborative thinking

skills of grade IV students in science learning. This model has been proven to encourage active participation, effective communication, and cooperation in groups, while significantly improving students' academic achievement. These findings confirm that the integration of local cultural values in collaborative learning not only enriches the learning experience, but is also relevant for strengthening 21st century skills at the primary education level. This research contribution provides an alternative contextual learning model that is applicable to various subjects, and encourages teachers to adopt similar approaches in building students' high-level thinking skills and social character. In the future, it is suggested that further research develop a variety of local culture-based methods in thematic learning and examine more deeply their impact on the formation of students' character and cultural literacy.

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Authors' Note

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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