IMPLEMENTATION OF THE ECLIPSE (EXPLORING, COMPILING, LINKING, IMAGINING, PRODUCING, SHARING, EVALUATING) LEARNING MODEL BASED ON ETHNOECOLOGICAL ISSUES TO IMPROVE STUDENTS' COLLABORATION AND CRITICAL THINKING SKILLS

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Abstract

21st-century education demands that students possess collaborative and critical thinking skills as core competencies to face global challenges. However, these skills are still low because the learning models used tend to be conventional and lack contextualization. This article proposes the development of the ECLIPSE (Exploring, Compiling, Linking, Imagining, Producing, Sharing, Evaluating) learning model based on ethnoecological issues as an innovation to improve student skills. This model emphasizes the integration of local values and ecological issues in every stage of learning so that students can learn through real-life experiences, collaborate in groups, and hone critical reasoning through analysis of environmental problems based on local wisdom. The study used a quantitative experimental approach with 47 Non-Formal Education students at the University of Bengkulu as subjects. The results show that the ECLIPSE model based on ethnoecology is effective in improving students' collaborative and critical thinking skills and contributes to the development of contextual learning models in higher education.

Keywords: ECLIPSE, ethnoecology, collaboration, critical thinking

1. INTRODUCTION

21st-century education presents new challenges and opportunities that demand a transformation of the learning paradigm in higher education. This century is characterized by the rapid development of digital technology, the flow of globalization, and the complexity of social, cultural, and environmental issues. To navigate this era, students must not only master factual knowledge but also possess 21st-century skills, including critical thinking, collaboration, communication, creativity, and digital and ecological literacy.

In the context of higher education, collaboration skills are a core competency that cannot be ignored. Collaboration enables students to work in teams, appreciate differences, develop shared ideas, and solve problems collectively. Critical thinking skills, on the other hand, require students to analyze information, identify assumptions, evaluate arguments, and make logical and responsible decisions. These two skills are essential for students to compete in a competitive workplace and contribute to society. Unfortunately, various studies in Indonesia indicate that these skills are still relatively low.

Students tend to be passive in their learning, relying more on information than constructing knowledge independently. Lecturers' learning models are still predominantly conventional, with lectures emphasizing memorization rather than developing higher-order thinking skills. As a result, students are less accustomed to asking critical questions, engaging in healthy debate, or working effectively in teams. Furthermore, local issues related to ethnoecology are underutilized as learning resources. Ethnoecology, which examines the relationship between humans and the environment from a local cultural perspective, is rich in values, knowledge, and sustainable practices that can be integrated into learning. For example, the Bengkulu community has traditions of forest management, environmentally friendly agricultural practices, and wisdom in preserving water resources. Unfortunately, this local wealth is rarely incorporated into teaching materials in universities. Integrating ethnoecological issues,

however, allows students to learn in a more contextual way, making them relevant to their daily lives, and encouraging them to think critically about environmental issues.

To address these challenges, this study developed the ECLIPSE (Exploring, Compiling, Linking, Imagining, Producing, Sharing, Evaluating) learning model based on ethnoecological issues. This model is designed as an alternative learning model that not only trains cognitive skills but also collaboration skills, critical thinking, and ecological awareness. Each stage in the ECLIPSE model encourages students to actively explore issues, compile data, connect theory with practice, imagine solutions, produce work, share results, and evaluate reflectively. When applied to an ethnoecological context, students not only learn theory but also understand environmental realities and local wisdom.

2. LITERATURE REVIEW

2.1 Collaboration Skills

Collaboration is the ability to work together in a team to achieve a common goal by leveraging the potential of each member. According to Johnson & Johnson (2018), collaborative learning can improve students' academic achievement, social relationships, and interpersonal skills. In the context of higher education, collaboration trains students to respect differences of opinion, manage conflict, and integrate diverse ideas. Research by Laal & Ghodsi (2019) found that collaboration skills contribute significantly to the employability of college graduates.

2.2 Critical Thinking Skills

Critical thinking involves the ability to analyze, evaluate, and synthesize information logically. Facione (2015) defines critical thinking as a reflective thought process focused on sound decision-making. In the context of university students, critical thinking is crucial for navigating the overwhelming flow of digital information, not all of which is valid. A study by Suryani (2020) found that the low critical thinking skills of Indonesian students are influenced by a lack of real-world problem-based learning practices and a lack of argumentation training.

2.3 Ethnoecology in Learning

Ethnoecology is the study of the relationship between humans and the environment based on local knowledge systems and culture. Toledo (2018) emphasized that ethnoecology is key to maintaining ecosystem sustainability. In Indonesia, Marfai (2021) emphasized that local wisdom in environmental management, such as the subak system in Bali or customary forest practices in Sumatra, can be integrated into environmental education. Thus, ethnoecology not only enriches students' knowledge but also instills cultural identity and ecological awareness.

2.4. ECLIPSE Model

The ECLIPSE model was developed as an innovative learning framework with seven main stages:

Exploring: exploring real issues or problems.

Compiling: compiling related data, information, or references.

Linking: connecting information with relevant theories or concepts.

Imagining: imagining solutions or alternative solutions.

Producing: producing concrete products, works, or solutions.

Sharing: sharing results with others to get input.

Evaluating: critically evaluating processes and outcomes.

The advantage of this model is the integration of critical thinking skills with social skills within a systematic learning framework. When combined with ethnoecological issues, ECLIPSE can be an effective medium for fostering ecological awareness and enhancing students' skills.

Bengkulu is a region rich in natural resources and local wisdom in environmental management. For example, the Rejang people have a simbang tradition of protecting their customary forests, the Serawai

people have customary rules for managing agricultural land, and the Enggano people have developed culturally based conservation practices. However, Bengkulu faces serious challenges such as deforestation, marine ecosystem damage, and mineral resource exploitation.

Unfortunately, these local issues have not been widely integrated into higher education. Non-formal education students at the University of Bengkulu, for example, often receive theoretical material without connecting it to the ecological realities of their region. This makes learning feel distant from students' daily lives, thus discouraging them from thinking critically or collaborating to find solutions.

Some relevant studies in the last 10 years include: Kokotsaki, Menzies, & Wiggins (2016) showed that project-based learning can improve students' learning motivation and collaborative skills; Savery (2015) emphasized that problem-based learning is effective in developing critical thinking skills, but requires the support of a structured learning model; Nisa (2019) found that integrating local wisdom into science learning in elementary schools can increase students' environmental awareness; Marfai (2021) showed that ethnoecology-based education can strengthen students' cultural identity and ecological awareness. International research by Thomas (2020) highlighted the importance of learning models that combine digital technology with local issues to improve 21st-century skills.

However, there has been little research integrating the ECLIPSE model with ethnoecological issues for university students, particularly in Indonesia. This represents a research gap.

From the description above, the identified research gaps are: No research has explicitly developed an ECLIPSE model based on ethnoecological issues. Previous research has focused on PBL or PjBL, but not on the systematic ECLIPSE framework. The integration of local wisdom into learning in higher education is still minimal. Research on ethnoecology emphasizes environmental knowledge aspects, rather than developing students' collaboration and critical thinking skills.

This research is important because it can fill the gap in the literature on the sethnoecology-based ECLIPSE model in higher education; provide an alternative innovative learning model for lecturers at the University of Bengkulu; help students understand local issues; and build ecological awareness, as well as preserve local wisdom.

3. RESEARCH METHODS

This study uses an experimental quantitative approach to test its effectiveness in improving students' collaboration skills and critical thinking skills.The research subjects were 47 students of the Non-Formal Education Study Program, Faculty of Teacher Training and Education, University of Bengkulu, in the 2023/2024 academic year. The research was conducted at the Non-Formal Education Study Program, University of Bengkulu, for six months, from February to July 2024.

The instruments used in this study include:

Collaboration skills instruments: observation rubric and indicator-based questionnaire Johnson & Johnson (2018), covering communication skills, active contribution, coordination, and responsibility.

Critical thinking skills instruments: essay tests and assessment rubrics based on Facione's (2015) indicators, covering interpretation, analysis, evaluation, and inference.

Model validation instrument: expert validation sheet (learning expert lecturers, ethnoecologists, and education practitioners).

Student response instrument: questionnaire to determine student perceptions and satisfaction with the implementation of the model.

Field trial: the model was applied to all research subjects (47 students).

Skills test: pre-test and post-test of critical thinking skills, as well as observation of collaboration skills.

Student response questionnaire: to measure the acceptance and effectiveness of the model from the students' perspective.

The research data were analyzed using qualitative and quantitative approaches: Critical thinking skills data were analyzed using paired sample t-test to see significant differences between pre-test and post-test results. Collaboration skills data were analyzed using descriptive statistics (mean, percentage, category). Expert validation was analyzed using the validity index (Aiken's V). The critical thinking test

instrument was tested using Cronbach's Alpha, while the reliability of the collaboration rubric was tested using inter-rater reliability.

4. Results and Discussion

Research result

The study was conducted on 47 students in the Non-Formal Education Study Program at the University of Bengkulu. The ECLIPSE model was implemented in one course for one semester. Observations showed that students were more actively involved in the learning process.

In the exploring stage, students identify local issues such as the destruction of mangrove forests on the coast of Bengkulu, the tradition of protecting water sources, and conflicts over plantation land.

At the compiling stage, they collect information from literature, community interviews, and field observations.

In the linking stage, students try to connect local issues with theories of non-formal education, ecology, and socio-culture.

At the imagining stage, creative ideas emerged such as digital campaigns based on local wisdom, environmental education modules for village communities, and community-based conservation plans.

At the producing stage, student groups produce posters, educational videos, and ethnoecology-based learning modules.

The sharing stage is carried out through presentations in class and uploads on academic social media.

The evaluating stage is carried out through joint reflection, both by students and lecturers.

Throughout the learning process, student activity increased from meeting to meeting. During the production stage, they produced creative products in the form of learning modules, educational videos, and digital posters. The sharing stage took place through mini-seminars in class.

Critical Thinking Skills, Critical thinking tests were conducted before and after the implementation of the model. The results of the analysis showed a significant increase: The average pre-test score: 62.3 and the average post-test score: 81.7. The paired sample t-test showed a sig. (p) value = 0.000 < 0.05, so the increase was statistically significant. This increase was seen in the analysis aspect (from 60% → 82%), evaluation (from 58% → 80%), and inference (from 65% → 83%).

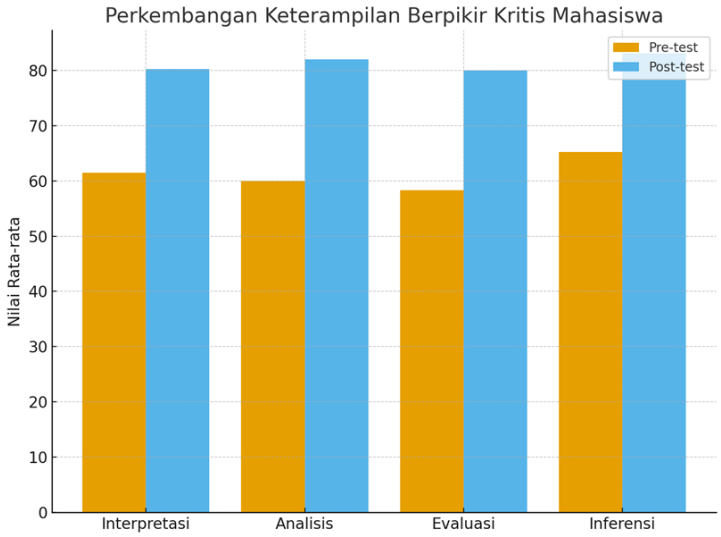

Fig. 1. Development of Students' Critical Thinking Skills

Collaboration Skills: Collaboration skills were measured through observations using the Johnson & Johnson (2018) rubric. The results: The “high” category increased from 21% of students (pre-model) to 76% of students (post-model). Open communication improved significantly; students engaged in more frequent discussions, asked questions, and provided feedback. Individual responsibility within the group also improved, as evidenced by timely completion of assignments and more equitable contributions.

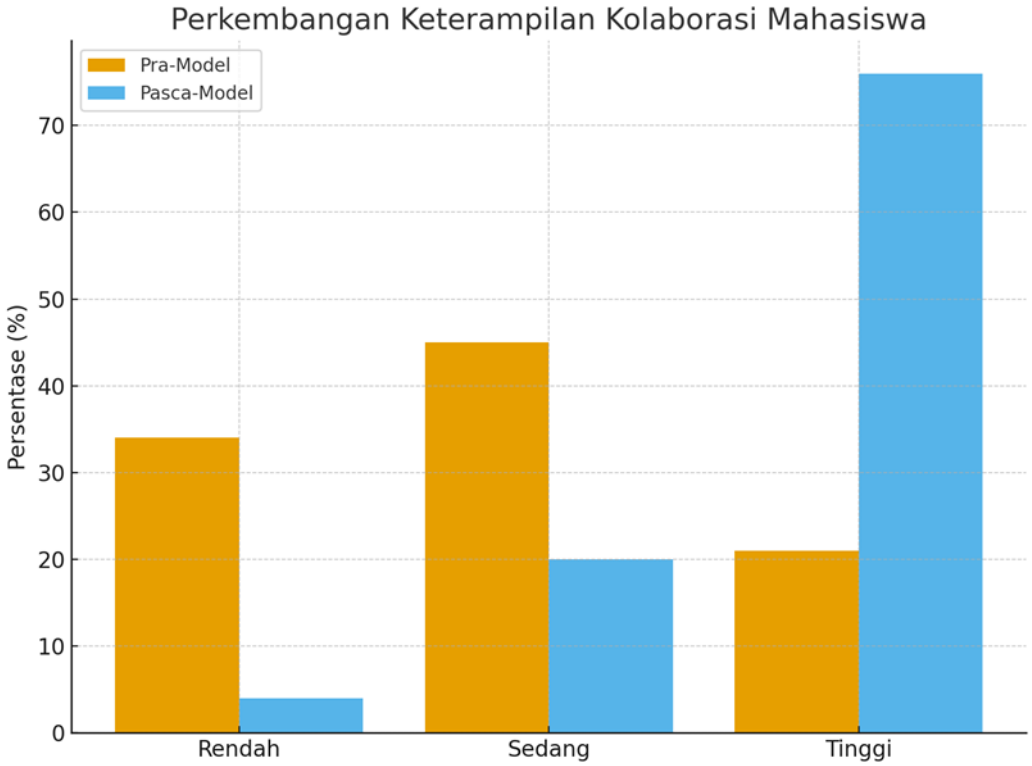

Fig. 2. Development of Students' Collaboration Skills

Student Response,A questionnaire response showed that 87% of students stated that this model made learning more engaging, 82% felt more motivated, and 90% considered the learning more relevant to real life. Criticisms raised the need for more flexible time management, as the production and evaluation stages require more time than the regular lecture allocation.

4.2 Discussion

The results of the study indicate that the ECLIPSE model significantly improves students' collaborative skills. The producing and sharing stages provide space for students to collaborate to produce products and share ideas, in line with Johnson & Johnson's (2018) cooperative learning theory, which emphasizes the importance of face-to-face interaction, individual responsibility, and shared goals. This study supports the findings of Laal & Ghodsi (2019) who stated that collaborative-based learning improves empathy, social skills, and learning motivation. The integration of ethnoecological issues makes students feel closer to the context being studied, thereby increasing their participation in group discussions.

The significant increase in students' critical thinking scores demonstrates that the ECLIPSE model effectively stimulates higher-order thinking skills. The linking stage encourages students to connect theory to real-world phenomena, while the evaluating stage trains them to critically evaluate proposed solutions.

These results align with Facione's (2015) critical thinking framework, which encompasses interpretation, analysis, evaluation, and inference. These findings also align with Suryani's (2020) study, which emphasized that problem-based learning can improve critical thinking skills in Indonesian students.

One of the strengths of this model is the integration of ethnoecological issues, which has been shown to strengthen students' ecological awareness and cultural identity. For example, when discussing the tradition of preserving indigenous forests, students understand not only the ecological aspects but also the cultural values inherent within them. This aligns with research by Toledo (2018) and Marfai (2021), which emphasizes the importance of ethnoecological-based education in supporting sustainable development.

Thus, this model not only improves cognitive and social skills, but also builds ecological awareness based on local wisdom.

This model has several advantages: Systematic: the steps are clear and directed, making it easier for lecturers and students; Contextual: ethnoecological issues make learning relevant to students' real lives; Collaborative: emphasizing group work in almost all stages; Reflective: the evaluating stage trains students to think critically and introspectively.

Despite its success, this study has limitations: The research subjects were limited to Non-Formal Education students at the University of Bengkulu, so the results cannot be generalized to other study programs. The duration of the study was relatively short, so the long-term impact has not been measured; and it has not been tested in the context of online or hybrid learning, which is currently increasingly relevant. However, this study adds to the literature on ethnoecology-based learning models, while strengthening the theory of collaborative learning and critical thinking and the ECLIPSE model can be adopted by other lecturers in higher education with adaptations according to their respective local contexts.

5. CONCLUSION

This study develops and tests the effectiveness of the ECLIPSE (Exploring, Compiling, Linking, Imagining, Producing, Sharing, Evaluating) learning model based on ethnoecological issues in improving collaboration skills and critical thinking skills of students of the Non-Formal Education Study Program, University of Bengkulu. Quantitative data proves a significant increase in students' critical thinking skills, with a clear difference between pre-test and post-test scores. Meanwhile, students' collaboration skills also increased, as seen from the increasingly even distribution of contributions, communication skills, and individual responsibilities within the group. The integration of ethnoecological issues in this model has a positive impact on students' learning motivation, ecological awareness, and strengthening of cultural identity. The ECLIPSE model is proven to be not only effective in training cognitive and social skills, but also able to provide contextual, reflective, and local value-oriented learning.

Thus, this study concludes that the ECLIPSE learning model based on ethnoecological issues is effective in improving students' collaboration and critical thinking skills, and is worthy of being used as an alternative learning innovation in higher education.

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