Proceeding of Integrative Science Education Seminar Vol. 5 No. 1, 2025, pp. 91-102

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Proceeding of Integrative Science Education Seminar

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Artikel

Evaluation of the Independent Curriculum for Science Education at MTsN 2 Kediri: Ecology and Biodiversity Material Using the Illuminative Model

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Article Info

1st AVES
Annual Virtual Conference of Education and Science 2021

Keywords:

Independent Curriculum
Science Learning
Ecology
Biodiversity
Illuminative model

ABSTRACT

Science education at the Madrasah Tsanawiyah level plays an important role in shaping students' understanding of nature and the environment, with an emphasis on providing direct experiences. However, the lack of enthusiasm among students for science education requires teachers to use interesting evaluation methods and approaches. This study aims to evaluate the implementation of the Merdeka Curriculum on Ecology and Biodiversity material in class VII MTsN 2 Kediri using an Illuminative Evaluation Model that focuses on a deep understanding of the interaction of various components in the learning context. The approach used was qualitative, with data collection techniques through classroom observation, interviews with teachers and students, and analysis of learning documents. The results showed that despite obstacles in implementing the teaching module due to dependence on Student Worksheets (LKS), teachers demonstrated innovation by integrating game-based learning methods into lecture and discussion strategies. This implementation made learning more interactive, increased student engagement, and developed critical and collaborative thinking skills.

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INTRODUCTION

Educationis a process of interaction between teachers and students designed to help studentsrealize their potential in teaching and learning activities. In principle, learning and teaching are two things that cannot beseparated and are closely related (Rita & Suyanto, 2007) The learning process in teaching and learningis a complete and inseparable system with learning components, namely input (in the form of students, curriculum, facilities and infrastructure), process (in the form ofmaterial, methods, media, evaluation), output, and feedback. Natural Sciences (IPA)is a field of study that plays an important role in shaping scientific thinking skillsand students' curiosity about natural phenomena (Ermalinda, 2020). In the context of junior high school education,science learning is directed so that students are able

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to understand scientific conceptsthrough direct experience. However, observations at MTsN 2 Kedirishow that science learning is often still theoretical anduninteresting for students.

The Merdeka Curriculum was introduced to give teachers the freedom to adapt learning materials and methods to the characteristics of their students (Abdullah, 2017; Siahaan & Siahaan, 2023). In its implementation, learning evaluation is an important aspect for assessing the achievement of objectives and the quality of the learning process. One approach that is considered relevant is the illuminative evaluation model, developed by Parlett and Hamilton. This model emphasizes a deep understanding of the learning context, not just the final results (Nurlaila et al., 2021). The Merdeka Curriculum emphasizes student-centered learning, competency orientation, and the importance of differentiation in the learning process. On the other hand, the implementation of this curriculum requires an appropriate evaluation system to assess the extent to which learning objectives have been achieved and how the process takes place in the classroom.

Recent research findings show the importance of applying contextual and reflective learning approaches in science education. Anggraini (2022), , through her research entitled "The Application of the Lesson Study-Based Problem Solving Learning Model on Critical Thinking Skills," revealed that the application of a problem-solving-based learning model combined with collaborative reflection among teachers can significantly improve students' critical thinking skills. These findings reinforce the urgency of implementing active learning strategies in line with the principles of the Merdeka Curriculum.

In addition, Anggraini et al. (2025) in the proceedings of Development of Ethnoscience Based Science Learning Module and Science Literacy for Junior High School Students developed an ethnoscience-based science learning module to improve the science literacy of junior high school students. The results of this study confirm that learning based on cultural and environmental contexts can strengthen students' understanding of scientific concepts while fostering their ecological awareness.

The illuminative evaluation model is an evaluation approach developed by Parlett and Hamilton as an alternative to traditional evaluation models that only emphasize learning outcomes. This model views learning as something that must be understood comprehensively through the context, process, and interactions that occur in the classroom (Nurlaila et al., 2021). The illuminative model consists of three main stages, namely observe, inquiry further, and seek to explain. In the observe stage, the evaluator directly observes the learning process in the classroom to understand the real situation and patterns of interaction between teachers and students. The inquiry further stage is carried out by digging deeper for information through interviews, document analysis, and review of the learning methods and media used. Meanwhile, the seek to explain stage focuses on analyzing and explaining the factors that influence the success and obstacles in the learning process.

Through these three stages, the illuminative model not only assesses the final results, but also explores how learning strategies are implemented and how students participate in learning activities. This approach is in line with the principles of the Merdeka Curriculum, which emphasizes teacher flexibility, student activity, and contextual and learner-centered learning (Abdullah, 2017; Siahaan & Siahaan, 2023). Therefore, this study applies the illuminative evaluation model to assess the effectiveness of science learning on ecology and biodiversity material within the framework of the Merdeka Curriculum at MTsN 2 Kediri, in order to obtain a comprehensive picture of the process, results, and supporting and inhibiting factors of learning.

This study aims to evaluate the implementation of the Merdeka Curriculum in science education at MTsN 2 Kediri using an illuminative model. The focus of the study is on the process of teaching ecology and biodiversity, student engagement, and the supporting and inhibiting factors in its implementation.

METHOD

The research method used was qualitative descriptive. The qualitative method was chosen because it is able to describe in detail and depth the implementation of the science learning process within the framework of the Merdeka Curriculum at MTsN 2 Kediri. The main objective of this method was to gain a comprehensive understanding of the dynamics of learning that occur naturally in the classroom. To achieve this objective, the researcher conducted a series of field activities, including site visits, orientation studies, and in-depth research on teachers and students.

This type of research is qualitative descriptive research, which is research based on facts found in the field without manipulating the variables being studied. According to Adussamad (2021), qualitative methods are research procedures that produce descriptive data in the form of written or spoken words from people and observable behavior. This approach is used to reveal the meaning behind social and educational phenomena, as well as to find truths that can be rationally accepted based on empirical experience. In this context, qualitative methods focus on understanding the principles and interactions that describe the existence of learning phenomena that occur in the school environment.

Data collection techniques were carried out participatively, where researchers were directly involved in the learning process to observe interactions between teachers and students and assess the effectiveness of the illuminative evaluation model. In addition, researchers conducted in-depth interviews with teachers and students to obtain information about the implementation of the Merdeka Curriculum, the obstacles encountered, and student responses to learning. The researchers also analyzed documents, such as the curriculum, teaching modules, Student Worksheets (LKPD), and student learning outcomes, which included formative and summative assessments.

In the context of the illuminative model, researchers not only observe the learning process but also apply the principles of the model, which consists of three stages: observe, inquiry further, and seek to explain. Each stage is carried out with in-depth reflection between researchers and participants to comprehensively understand how the Merdeka Curriculum is implemented, how learning interactions occur, and how the illuminative model helps reveal the effectiveness and obstacles that arise in the learning process. This reflection process is an important part of finding a holistic understanding of the impact of applying the learning model on improving the quality of science learning at MTsN 2 Kediri.

RESULT AND DISCUSSION

a. The Relationship between the Merdeka Curriculum and the Illuminative Model

The Merdeka Curriculum and the illuminative evaluation model are strongly aligned in their principles and orientation towards learning. Both depart from the same paradigm, namely that the educational process must focus on students as the main subjects of learning, not merely objects that receive information. The Merdeka Curriculum gives teachers the freedom to adjust learning strategies, methods, and media based on the interests, needs, and characteristics of learners. Thus, learning becomes more adaptive, contextual, and relevant to the real lives of students (Siahaan & Siahaan, 2023).

Meanwhile, the illuminative model developed by Parlett & Hamilton (1972) emphasizes that learning evaluation is not merely about measuring outcomes, but also about understanding the context, process, and meaning of the learning activity itself (Nurlaila et al., 2021). This model is exploratory and reflective in nature, as it seeks to explore the factors that influence the success of educational programs in depth. Through this approach, evaluators can see how the Merdeka Curriculum is actually implemented in the classroom, from lesson planning and teacher-student interactions to student responses to the methods used.

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The relationship between these two approaches can be seen from their shared focus on meaningful and process-oriented learning. The Merdeka Curriculum provides a flexible framework for teachers to design contextual learning experiences, while the illuminative model provides an evaluative framework to understand the extent to which these designs are effective in the field (Wahyuni et al., 2023). With this combination, teachers can reflect more deeply on classroom dynamics, find appropriate teaching strategies, and make continuous improvements to learning practices.

In addition, the application of the illuminative model in the context of the Merdeka Curriculum also helps to create a learning culture that is open to change. The evaluation is not judgmental in nature, but rather aims to provide feedback for improving the quality of learning. Thus, teachers can identify strengths, weaknesses, and opportunities for development in the implementation of the Merdeka Curriculum, so that the results of the evaluation are not only beneficial to individual teachers, but also to the development of the education system as a whole.

b. Implementation of Science Learning at MTsN 2 Kediri

Science teachers at MTsN 2 Kediri have implemented learning in accordance with teaching modules compiled based on the principles of the Merdeka Curriculum. Learning begins with apperception and motivation activities, followed by core activities involving lectures, group discussions, and discovery learning activities. In these activities, teachers also integrated educational games to strengthen student participation (Dewi, 2022; Lestari et al., 2023).

Students showed high enthusiasm and played an active role in the learning process. They were involved in discussions, asked questions, and gave opinions when discussing ecosystems and biodiversity. Through field observations and games, students not only understood the theory but were also able to relate it to the surrounding environmental conditions.

c. Overview of the Science Learning Process for Ecology and Biodiversity Material

The learning plan is compiled in the form of teaching modules that follow the Content Standards. According to (Nurlaila et al., 2021), this learning plan includes the preparation of a learning implementation plan, learning media and resources, assessment tools, and learning scenarios. The preparation of these teaching modules is tailored to the learning approach used. The learning components used in schools should be designed by the teachers themselves. This is so that the learning objectives and processes can be adapted to the conditions of the school, the characteristics of the students, and their learning environment. The learning process implemented by teachers must be relevant to the situation in the school environment. Thus, when conducting evaluations, teachers can design evaluations that are in line with the learning objectives that have been set. Based on this, teachers are encouraged to be able to develop their own teaching modules.

The implementation of science learning with ecology and biodiversity materials has generally been in accordance with the teaching modules that have been prepared. Teachers carry out learning in accordance with the existing teaching modules so that the process runs smoothly. The results of the analysis show that teachers have implemented all aspects of the learning process. In the initial stage, teachers conduct preliminary activities that include observation, perception, and motivation to convey learning objectives. Next, teachers continue

to the core activities by delivering material using lecture and discussion methods.(Nurlaila et al., 2021)

From the researcher's observations, students showed good participation in the learning process. They were active and responsive to the material presented, and participated in discussions and other learning activities. Students demonstrated a good understanding of the topics taught and participated enthusiastically. Overall, students displayed a positive attitude and high motivation in participating in learning, reflecting the effectiveness of the teaching methods used by the teacher.

Although teachers more often give lectures or deliver material during the learning process, they also apply discussion methods. Based on the results of interviews with science teachers, it was revealed that they usually use lectures as the main method. Teachers feel it is important to complete all the material and questions in the Student Worksheet (LKS) so that students can complete their assignments and understand the content of the teaching module (Nurlaila et al., 2021). Therefore, the teachers' main focus is on completing the LKS, while other learning methods such as discussion are still implemented using games as a medium.

However, according to (Mustika, 2017), it is important for teachers to continue to use various learning models to increase student engagement and understanding. By combining lecture methods with discussion through games, teachers can create a more dynamic and comprehensive learning experience for students. Teachers can also integrate worksheets into more interactive learning activities, so that students not only complete tasks but also understand concepts in depth. This will help students develop critical thinking and teamwork skills, as well as provide a more meaningful and enjoyable learning experience. Here, teachers use various learning models appropriately, even when utilizing games. In their teaching modules, teachers adopt a scientific approach to learning, involving discussion and lecture methods, and applying the Discovery Learning model to provide a more interactive and exploratory learning experience for students.

Process standards cover the stages of planning and implementing learning to ensure effective and efficient learning. In this learning context, teachers have used previously selected teaching modules and media. The results of observations conducted by researchers show that these teaching modules are in line with all elements applied in the learning process, including objectives, learning models, approaches, and other components, and are complete in terms of content and presentation.

d. Application of the Illuminative Evaluation Model

The results of the observation show that teachers have applied the principles of the illuminative model through three stages, namely:

1. **Observation Stage:**

Based on the results of this study, researchers found that teachers have used learning tools that are in line with the Merdeka Curriculum standards. However, researchers also found that teachers face challenges in implementing teaching modules. These challenges are mainly due to dependence on Student Worksheets (LKS), which hinders the optimal implementation of teaching modules. To overcome these obstacles, teachers use a game-based approach as a strategy to deliver material from LKS more effectively and attractively to students. According (Dewi, 2022), a game-based approach helps teachers deliver SWL material in a more interactive and enjoyable way. By using games, teachers can make students more engaged and motivated in the learning process, thereby improving their understanding of the material. These games also provide opportunities for students to actively participate, discuss, and develop critical thinking skills.

In addition, the use of games as learning aids allows teachers to be more flexible in adapting teaching methods to the needs and interests of students (Fatimah et al., 2020). Teachers can design games that are relevant to the topic being studied, so that students can

learn in a more contextual and relevant way to their daily lives. This not only improves students' understanding of the material, but also helps them develop cooperation and social skills.

Thus, even though teachers face challenges in implementing teaching modules in accordance with the Merdeka Curriculum, they can overcome these obstacles with innovation and creativity in using games as learning aids. This approach not only makes the learning process more interesting and enjoyable (Lestari et al., 2023), but also ensures that students can achieve the learning objectives set out in the teaching modules.

Next, the researcher continued to observe the learning process of the Science Subject Material on Ecology and Biodiversity. In this observation, the teacher carried out the learning process in accordance with the learning tools available. The teacher followed the stages outlined in the teaching module, starting from the introductory activities, core activities, to closing activities. All of these stages were adjusted to the sub-topics taught and the learning methods used, ensuring that the learning took place in accordance with the plans and objectives that had been set.

During the learning process, students showed very active participation. They not only listened attentively, but also engaged in various learning activities. Students participated in discussions, asked questions, and responded to questions asked by teachers or their friends. This active participation reflected the students' high level of interest and motivation towards the material being taught.

Game-based activities implemented by teachers increasingly encourage student engagement. Students appear enthusiastic and excited to participate in games designed to deepen their understanding of the material. They work together in groups, share ideas, and actively contribute to completing the tasks given during the game (Wahyuni et al., 2023)

In addition, students' active participation was also evident in how they applied the knowledge they had acquired. Students were able to connect the concepts they had learned to real-life situations, demonstrating that they understood the material not only theoretically but also practically. This engagement enriched their learning experience and helped strengthen their understanding of the topics taught. Overall, the approach used by teachers in overcoming the challenges of implementing teaching modules by integrating games into learning has succeeded in creating a dynamic and interactive learning environment. This not only improves the quality of learning but also ensures that students are actively and enthusiastically involved, thereby achieving optimal learning outcomes in line with the objectives of the Merdeka Curriculum.

Figure 1. Classroom observation

2. **Inquiry Further Stage:**

In the advanced inquiry stage, researchers strengthen existing issues, trends, and problems until they conclude that no new problems have emerged. At this stage, the researcher found problems that had been identified in the first stage of observation. The problems found were obstacles experienced by science teachers in designing learning tools and media for ecology and biodiversity material.

Teachers revealed that the implementation of the Merdeka Curriculum differs from the previous 2013 Curriculum. In addition, the lack of preliminary knowledge provided by schools in the form of training means that teachers' knowledge of the Merdeka Curriculum is still very limited. This is particularly felt by older teachers, who are less proficient in the technologies that are often used in the current Merdeka Curriculum.

3. **Seek to Explain Stage:**

The learning plan is organized in the form of modules that utilize learning media, learning methods, teaching material modules, and relevant and creative student worksheets in accordance with the Merdeka Curriculum. This plan includes the preparation of modules, media, and teaching material modules that run regularly.

The results of the analysis and implementation of learning show that teachers have implemented all aspects of the module. In the initial stage, teachers began with introductory activities that included greetings, apperception, and providing motivation by conveying learning objectives. Then, teachers continued with core activities by delivering material on ecology and biodiversity, using lecture and discussion methods. In addition, the teacher applied the Discovery Learning model to provide a more interactive and exploratory learning experience for students when working on the worksheets.

The modules are developed using a scientific approach. The learning components at school are created by the teachers themselves so that the learning objectives and processes can be planned according to the conditions of the school, the characteristics of the students, and the learning space. The learning process must be adapted to the school environment so that during evaluation, teachers are able to design evaluations that are in line with the learning objectives that have been set.

Based on the results of the observation, the researcher concluded that the module created by teachers at MTsN 2 Kediri for science subjects was in accordance with the Merdeka

Curriculum standards. The assessment aspects included the results of student worksheets, formative assessments, and summative assessments of ecology and biodiversity material completed by students individually and in groups.

Data analysis shows that the learning scenarios and modules created are appropriate. The implementation of science learning at MTsN 2 Kediri is generally in accordance with the modules that have been developed. Next, we will discuss in detail the results of the analysis of the implementation of the science learning process in the implementation of the Merdeka Curriculum at MTsN 2 Kediri in grade VII for the subject of Natural Sciences.

e. Student Assessment Results

Based on the analysis of assessment documents, it was found that most students showed excellent achievement. The scores on the Student Worksheet (LKPD) activities reached an average of 100, indicating that all students were able to complete the tasks correctly and independently. The formative assessment scores ranged from 80 to 90, indicating that most students understood the basic concepts of ecology and biodiversity well. Meanwhile, the summative assessment scores ranged from 70 to 100, indicating that most students had achieved the expected level of competence in accordance with the learning objectives.

These results show that the implementation of the Merdeka Curriculum with a scientific approach and discovery learning model is effective in improving student learning outcomes. Students who actively participated in discussions, educational games, and environmental exploration activities showed a higher increase in conceptual understanding compared to passive students. These findings are in line with the opinions of Dewi (2022) dan Lestari et al. (2023) who state that active and experience-based learning can increase student motivation and learning outcomes. In addition, the use of the discovery learning method allows students to build understanding through a process of observation and discovery, rather than just passively receiving information (Ermalinda, 2020).

Tabel 1 Results of LKPD, Formative Assessment, and Summative Assessment of Ecology and Biodiversity Material for Grade VII at MTsN 2 Kediri

Name	LKPD	Assesmen Formatif	Assesmen Sumatif
Ahmad Akbar Faiz Risqullah	100	81	80
Ahmad Wafi Rizza Pratama	100	80	80
Aisna Naimatuz Zahira	100	88	70
Alif Laksono	100	81	60
Areta Hanania	100	90	80
Anggia Silva Putri	100	100	90
Clarissa Octa Salsabila	100	88	100
Devano Raditya Aliansyah	100	88	80
Dimas Fachrizal Pratama	100	88	60
Favian Febriano Purbaning Putra	100	81	60
Fira Aulia Ramadani	100	100	80
Firna Aura Lavenia	100	88	80
Fringka Desvita Al Zahra	100	88	70
Gita Ayu Saputri	100	90	70
Ja'far Firdausy Nur Ismail	100	80	70
Lailatul Safira Ramadhani	100	100	70
M.Ashroqil Anwar Al Ashari	100	80	100
Maya Angelia Srianto Putri	100	100	80

Moh. David Setiawan	100	81	70
Moh. Hikmal Assafiq	100	88	100
Moh. Alif Putra Herlianto	100	88	90
Mohamad Fani Dakvan Jannata Syukur	100	80	80
Mohamad Zudan Dwi Syahputra	100	80	80
Muhammad Busyairi Musyafi' Abdillah	100	88	88
Muhammad Fadhil Santoso	100	88	100
Muhammad Qirzul Fahmil Akbar	100	80	80
Mumtaza Fathina Manfaati	100	100	70
Murni Alfinasari	100	88	60
Nadia Agustya	100	90	70
Narita Manjani Angelia	100	100	90
Naura Ferdiana Azahwa	100	90	70
Nikita Sekar	-	-	-
Nizam Bahrul Ulum	100	81	90
Puan Fatima Dzakiyah Sakhi	100	90	80
Radhitya Rizky Eka Putra	100	80	70
Zahra Adelia Avriliyany	100	90	60
Zalfa Nanda Natasya Ramadani	100	88	80

f. Supporting and Inhibiting Factors

The results of the study indicate that the implementation of the Merdeka Curriculum in science education at MTsN 2 Kediri has been quite successful thanks to several supporting factors. One of the main factors is the support from the school, both in terms of policy and the provision of learning facilities. The school provides ample opportunity for teachers to innovate in the preparation of teaching modules and the implementation of project-based learning activities. This support makes it easier for science teachers to apply contextual learning in accordance with the characteristics of the students.

In addition, teacher creativity is an important factor in the successful implementation of learning. Teachers are able to adapt learning activities to remain interesting despite the limitations of laboratory equipment. The use of digital learning media, such as educational videos and food chain simulations, helps students understand the concepts of ecosystems and biodiversity more concretely (Mahmudah, 2020; Razak, 2023). Learning is also reinforced by group activities, discussions, and educational games that increase student participation.

Another supporting factor is collaboration with the community and the surrounding environment, where students make direct observations of the ecosystem around the school. This activity provides an authentic learning experience and strengthens the connection between theory and practice (Barlian & Solekah, 2022).

On the other hand, there are several obstacles in the implementation of learning. Limited science laboratory facilities are a major obstacle that restricts direct experimental activities. In addition, there are still teachers who need additional training related to the use of authentic assessments and the application of inquiry-based projects, so that the assessment is in accordance with the characteristics of the Merdeka Curriculum (Laesandi et al., 2022; Rahayu et al., 2022). Variations in students' readiness for independent learning also pose a

challenge, as not all students are accustomed to learning patterns that require exploration and self-reflection.

However, teachers are able to overcome these obstacles by implementing simple yet contextual innovations, such as observing plants in the school yard and making food chain charts from recycled materials. These efforts prove that the implementation of the Merdeka Curriculum can still be effective even with limited facilities, as long as teachers are able to manage learning creatively and adaptively in accordance with the situation in the field.

CONCLUSION

This study concludes that the implementation of the Merdeka Curriculum in teaching science subjects on Ecology and Biodiversity at MTsN 2 Kediri has been effective with the support of the illuminative evaluation model. This model helps evaluate the learning process comprehensively through observation, investigation, and explanation stages that highlight teacher-student interactions and the use of learning media and methods. The results of the study show that discovery learning-based learning and educational games can increase student participation, conceptual understanding, and learning outcomes with high average scores on each assessment.

Supporting factors for success include school support, teacher creativity, and the use of digital media, while the main inhibiting factors are limited laboratory facilities and variations in student readiness. Nevertheless, teachers were able to adapt through attractive and effective contextual learning innovations.

As a recommendation, further research could expand the study of the implementation of the Merdeka Curriculum in other subjects or develop more measurable evaluation instruments to assess the effectiveness of the illuminative model in the context of science learning at various levels of education.

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