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Development Of Outdoor Learning-Based Independent Flow Teaching Module to Improve Critical Thinking Abilities in Science Learning in Grade VII of SMP 2 Darul Hikmah, Aceh Jaya District.

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ABSTRACT

The students' critical thinking skills are less than optimal in science learning. This study aims to develop and produce a MERDEKA flow teaching module based on outdoor learning to improve critical thinking skills in science learning in grade VII of SMP 2 Darul Hikmah, Aceh Jaya Regency. This objective is based on the results of the analysis which shows that students' critical thinking skills are not optimal in science learning. This study uses the Research and Development (R&D) ADDIE model method with three stages, namely Analysis, Design, Development. The analysis stage is carried out to identify students' needs and problems faced in science learning. The design stage involves planning a learning module that integrates outdoor learning activities with the MERDEKA flow. Module development is carried out by designing interactive and interesting materials and activities. The results of the study concluded that the use of the MERDEKA flow teaching module based on outdoor learning is effective in improving critical thinking skills in science learning in grade VII of SMP 2 Darul Hikmah, Aceh Jaya Regency. This can be seen from the average N Gain score of 0.806498609 with a very effective category.

1. Introduction

The development of education in Indonesia is inseparable from the ongoing curriculum reforms to adapt to the needs of the times (Fajri et al., 2023). One form of this reform is the birth of the Independent Curriculum, which is designed to provide more freedom and flexibility to educators and students in the learning process. The Independent Curriculum not only focuses on mastery of academic material, but also emphasizes the importance of character development, critical thinking skills, and creativity (Cholilah et al., 2023). As Eko Risdianto argues (in Boang Manalu et al., 2022), the

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presence of the independent learning curriculum aims to address the challenges of education in the era of the industrial revolution 4.0, where its implementation must support skills in critical thinking and problem-solving, creativity and innovation, as well as skills in communication and collaboration for students. One learning approach relevant to the Independent Learning curriculum is the "Alur MERDEKA". The word "MERDEKA" itself is an acronym for "Starting from the Self," "Concept Exploration," "Collaboration Space," "Contextual Demonstration," "Elaboration of Understanding," "Connections Between Materials," and "Real Action" (Pribadi et al., 2023). Thus, the "MERDEKA Flow" is an innovative and creative learning approach with learning activity stages embedded in each letter of the word "MERDEKA." The goal of implementing the "MERDEKA Flow" is to provide students with the freedom to learn in a controlled and guided manner (Jamaludin et al., 2023).

This learning approach provides students with the freedom and autonomy to direct and manage their own learning process according to their interests, talents, and needs. The implementation of the "MERDEKA Flow" in learning is highly aligned with the "Merdeka" curriculum. According to Juliati Boang Manalu (2022), the "Merdeka Learning" curriculum not only supports educational equity in Indonesia, but also supports the government's affirmative action policies for students from disadvantaged, frontier, and outermost (3T) regions, but also shifts learning methods from classrooms to out-of-classroom learning. Integrating the MERDEKA approach with outdoor learning is considered highly effective in fostering 21st-century skills, particularly critical thinking skills, in students. Through direct experiences interacting with the natural environment, students can develop a deeper understanding. They can engage directly with natural phenomena, observe, interact, and discover material concepts more meaningfully. Critical thinking skills help students analyse information, solve problems, and make decisions.

Factors contributing to low levels of critical thinking in students include the selection of inappropriate, teacher-cantered learning methods and models. This learning model makes students passive and unmotivated to learn. As Amijaya (in Ramdani et al., 2020) noted, one of the problems faced in Indonesian education is the weak learning process. Students are not motivated to develop critical thinking skills, master concepts, and classroom learning is often limited to memorizing information without understanding what they remember. By developing critical thinking skills, students can develop a deep understanding of subject matter, develop strong communication skills, achieve academic achievement, develop problem-solving skills, and enhance their adaptability, all of which enhance creativity.

From field observations, the problem encountered by students in science learning is the suboptimal development of critical thinking skills. Teachers still tend to adopt conventional teaching methods, with the teacher taking an active role while the students remain passive. Furthermore, teachers tend to use worksheets (LKS) as teaching materials, employ lecture methods without incorporating other methods, and use a lack of varied learning media. These methods conclude with exercises without any reflection on the learning process. This results in monotonous, teacher-cantered learning, leading to student passivity and boredom. Ultimately, students are not encouraged to think critically, resulting in a poor understanding of the material in each subject.

Based on previous research on the implementation of the MERDEKA flow (Mahful et al., 2024), they concluded that the implementation of the MERDEKA flow in the learning process significantly impacted the abilities of seventh and eighth grade teachers in planning, implementing, and evaluating learning outcomes. Research conducted by (Ihsan et al., 2024) demonstrated that the implementation of the MERDEKA flow significantly impacted students' financial literacy skills and provided them with an understanding and skills in financial literacy. (Ramadan & Khaeruddin, 2024) found that the implementation of the MERDEKA flow helped students improve their understanding of their rights and obligations as independent citizens.

Research related to outdoor learning includes research by Riyanda Maisya et al. (2020) that found the outdoor learning method had an impact on the complex problem-solving skills of seventh grade students at SMP 6 Pekanbaru. This was evident in the improvement in students' complex problem-solving skills compared to previous years. Research by Clementin Juni Antari et al. (2021) showed that thematic learning among seventh-grade students at Taba Remanik Public Middle School (SMP Negeri 3) after implementing the Outdoor Learning Model significantly improved, with an average student learning score of 74.27. Research by Siti Nur Rohmawati Windasari (2023) concluded that outdoor-based inquiry learning positively impacted seventh-grade students' understanding of science concepts related to plants and their functions at SMP Negeri 3 CEPU.

To address this need, this study aims to develop an effective outdoor-learning-based MERDEKA learning module for science in junior high schools. This module is designed to provide clear guidance for teachers in implementing the MERDEKA learning model and to help students develop critical thinking skills through interactive activities relevant to everyday life. The authors hope this module can be an innovation in science learning in junior high schools, enabling students not only to understand science material but also to think critically in facing the challenges of the globalization era.

2. Methodology

This research uses Research and Development (R&D). Research and Development (R&D) is the process or steps taken to develop a new product or improve an existing one (Judijanto et al., 2024). This R&D model uses the ADDIE development model. The research and development procedure adheres to the ADDIE development model by Dick and Carry (in Sustiyanti, 2022). Therefore, this research has five development stages: analysis, design, development, implementation, and evaluation.

However, this research is limited to three stages: analysis, design, and development, with each stage explained as follows:

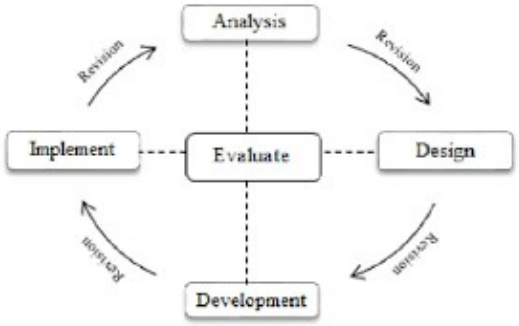

Fig. 1. ADDIE concept (Branch 2019:2 in Restian et al., 2020)

1) The analysis stage aims to examine the objectives of the product to be developed. Activities in the analysis stage include analyzing research needs, determining the research location, applying for permits from designated schools, and conducting preliminary studies (literature studies, field surveys); analyzing student characteristics; analyzing student needs; analyzing teacher and student needs; and analyzing learning materials.
2) The design stage includes developing tests, selecting learning materials and media, and designing learning modules.

3) The development stage includes product validation by experts (material experts, language experts, and learning design experts), revising learning modules based on input from validators, and conducting trials.

The research subjects were 225 seventh-grade students at SMP 2 Darul Hikmah, with a sample size of 76. The object of the development research will be the MERDEKA flow teaching module based on outdoor learning in science. Data collection techniques used in this study included questionnaires, tests, and documentation. The questionnaires used were a pre-research questionnaire and a validation questionnaire. The questionnaires used were open-ended and closed-ended. The open-ended questionnaire allowed respondents to express their feelings in detail, while the closed-ended questionnaire used a 4-point Likert scale to facilitate respondents' choice of answers to the questions posed by the researcher. Tests were used to determine students' abilities, both before the pre-test and after the post-test. Documentation included teaching modules, student lists, photographs of learning activities, and reference books or journals.

This study employed two data analysis techniques: qualitative and quantitative. Qualitative data obtained from teacher and student needs questionnaires, as well as validator suggestions and comments, will be analysed descriptively. The researchers will use the qualitative data as a reference for improving and refining the module. Quantitative data obtained from the validator and the test will be analysed using SPSS version 27. Quantitative data will be used to determine the feasibility and effectiveness of the developed teaching module.

3. Result

This development research produced an outdoor learning-based MERDEKA flow teaching module for fifth-grade science, focusing on ecosystem components. To achieve this final result, the development was carried out through three stages: analysis, design, and development. The analysis stage consisted of research needs analysis related to literature and field studies, student characteristics analysis, teacher and student needs analysis, and learning material analysis. Based on the analysis, the following results were obtained:

1. SMP 2 Darul Hikmah was selected as a sample in the experimental class, considering that the school has many areas suitable for outdoor learning, such as the school garden, rice fields, fields, and yards.
2. The characteristics of students at SMP 2 Darul Hikmah are that the majority of students have suboptimal critical thinking skills. They come from rural areas and lower-middle-class families whose livelihoods are farmers, laborers, fishermen, and small traders. They also pay little attention to their children's academic achievement.
3. Limited textbooks and learning media result in a reliance on worksheets (LKS) as teaching materials and the lecture method as the mainstay of learning. This results in ineffective learning, resulting in passive students due to the lack of interaction that can enhance their critical thinking skills.
4. Outdoor learning is a preferred learning activity for students, so I chose the ecosystem component material in this study. This is based on my curriculum analysis, which identified material by aligning it with the phase, grade, Learning Outcomes, and Learning Objectives.

Design Stage (Development), The design stage is carried out based on the data obtained in the analysis stage. There are several actions that need to be taken in the planning stage. In the design stage, researchers adjust the learning plan to the objectives, assessments, models, and natural environment media. In the development stage, modules are created to suit the characteristics of students. The module creation has also been adjusted to the stages of the MERDEKA flow according

to the natural environment media. This module includes all components that must be available in the independent curriculum teaching module as stated by (Owon et al., 2024, Heliwasnimar et al., 2024) which includes 3 components: general information, core competencies, and attachments.

Table 1. Components of the teaching module

Teaching module components	Details
General information	Module Identity Initial Competencies Pancasila Student Profile Facilities and Infrastructure Target Students Learning Model
Core Competencies	Learning Objectives Meaningful Understanding Prompting Questions Learning Activities Assessment Enrichment Remedial
Attachment	Student worksheets (LKPD) Reading materials for teachers and students Glossary Bibliography

After completing the module development, the researchers conducted validation activities with the validators through a validation questionnaire. The validators validated the material, language, and learning design in the teaching module. In the first validation of the teaching module, the validators provided input on adding color to the learning activities that demonstrate critical thinking skills and logos in the teacher and student reading materials. They also added critical thinking instruments to the assessment rubric for the LKPD.

Table 2. Image of the teaching module before and after revision

Modul Ajar Revisi	Modul Ajar Setelah Revisi
	

From the final results of the teaching module validation, an average score of 3.7 or 92.5% was obtained for the validation of material experts, 3.61 or 90.25% for the validation of language experts and 3.82 or 95.5% for the validation of learning experts with a very suitable category.

Table 3. Validation Results Summary

Validation Types	**Eligibility Percentage**
Validation by content experts	92,5%
Validation by language experts	90,25%
Validation by learning design experts	95,5%

The subsequent trial of the teaching module was held at SMP 2 Darul Hikmah, including a total of 76 students. The trial outcomes are as follows:

Table 4. Results of Critical Thinking Skills Data Analysis (N Gain)

Responden	**N Gain**	**N Gain (Catagory)**
78 responden	0,806498609	Very effective

The table above shows that out of 76 students, the average N Gain per student was 0.806498609. This indicates that the MERDEKA flow-based outdoor learning module, with ecosystem components, in seventh-grade science lessons, is highly effective in improving students' critical thinking skills.

The MERDEKA flow-based outdoor learning module in seventh-grade science lessons with ecosystem components provides a detailed overview of effective learning implementation. Students feel enthusiastic about learning due to the differentiation of the learning environment and its alignment with learning styles. Learning using this module makes students more active. Learning activities with the Merdeka flow outside the classroom have a positive impact in the form of improved critical thinking skills, as stated by (Antari et al., 2021), who state that outdoor learning is a learning activity carried out outside the classroom that directly invites students to immerse themselves in nature to better understand their surroundings and can foster more critical and creative thinking.

4. Conclusions

This research produces a teaching module for the Merdeka flow based on outdoor learning in science learning on ecosystem components for class VII of SMP 2 Darul Hikmah, Aceh Jaya Regency. This teaching module product provides very clear and detailed instructions for learning outside the classroom with the MERDEKA flow. This module was developed in accordance with the teaching module components in the Merdeka curriculum which include all components of general information, core competencies, and attachments. From the results of research conducted at SMP 2 Darul Hikmah, Aceh Jaya Regency, it shows that the use of the MERDEKA flow teaching module based on outdoor learning has a positive impact on improving students' critical thinking skills. This can be seen from the N Gain value of 0.806498609 with a very effective category.

References

Antari, C. J., Triyogo, A., & Egok, A. S. (2021). Penerapan Model Outdoor Learning pada Pembelajaran Tematik Siswa di Sekolah Dasar. Jurnal Basicedu, 5(4), 2209–2219. https://doi.org/10.31004/basicedu.v5i4.1165

Boang Manalu, J., Sitohang, P., Heriwati, N., & Turnip, H. (2022). Pengembangan Perangkat Pembelajaran Kurikulum Merdeka Belajar. Jurnal Mahesa Center, 1(1), 80–86. https://doi.org/10.34007/ppd.v1i1.174

Cholilah, M., Gratia Putri Tatuwo, A., Prima Rosdiana, S., & Noor Fatirul, A. (2023). Pengembangan Kurikulum Merdeka Dalam Satuan Pendidikan Serta Implementasi Kurikulum Merdeka Pada Pembelajaran Abad 21. Sanskara Pendidikan Dan Pengajaran, 01(02), 57–66. https://doi.org/10.58812/spp.v1.i02

Fajri, S., Ulaini, N., & Susantri, M. (2023). Implementasi Kurikulum Merdeka pada Pembelajaran Sejarah. Kaganga:Jurnal Pendidikan Sejarah Dan Riset Sosial Humaniora, 6(2), 387–397. https://doi.org/10.31539/kaganga.v6i2.7164

Heliwasnimar, H., Basri, H. H., & Fadriati. (2024). Implementasi Kurikulum Merdeka di SD. Journal on Educatio, 6(4), 20835–20842.

Ihsan, M. Al, Syamsuyurnita, Sari, S. P., & Nasution, I. S. (2024). PENGARUH PENERAPAN ALUR MERDEKA TERHADAP KEMAMPUAN LITERASI FINANSIAL SISWA DI KELAS V. Edusaintek: Jurnal Pendidikan, Sains Dan Teknologi, 11(2), 463–472. https://doi.org/10.47668/edusaintek.v11i2.1042

Jamaludin, U., Pribadi, R. A., Zahara, G., & Abstract, A. T. (2023). Pengembangan Media Pembelajaran Berbasis Alur Merdeka. Jurnal Ilmiah Wahana Pendidikan, 9(14), 710–716. https://doi.org/10.5281/zenodo.8186852

Judijanto, L., Muhammadiah, M., Utami, R. N., Suhirman, L., Laka, L., Boari, Y., Lembang, S. T., Wattimena, F. Y., Astriawati, N., Laksono, R. D., Mars, & Yunus, M. (2024). Metodologi Research And Developmet (Teori dan Penerapan Teori RnD) (Sepriano & Efitra, Eds.; Pertama). PT. Sonpedia Publishing Indonesia.

Mahful, Madjid, M. I., & Suharli, L. (2024). PENGARUH PENERAPAN ALUR BELAJAR MERDEKA TERHADAP KEMAMPUAN GURU GUGUS SATU TARANO DALAM MENERAPKAN PEMBELAJARAN BERDIFERENSIASI. SEMINAR NASIONAL MANAJEMEN INOVASI, 7(1), 133–142. https://conference.uts.ac.id/index.php/semai

Maisya, R., Hermita, N., Noviana, E., & Alpusari, M. (2020). IMPLEMENTASI METODE OUTDOOR LEARNING TERHADAP COMPLEX PROBLEM SOLVING SKILLS PADA MATA PELAJARAN IPA SISWA KELAS V SDN 56 PEKANBARU. Jurnal PENELITIAN ILMU PENDIDIKAN, 3(1), 22–32.

Manalu, J. B., Sitohang, P., & Turnip, N. H. H. (2022). Pengembangan Perangkat Pembelajaran Kurikulum Merdeka Belajar. Jurnal Mahesa Center, 1(1), 80–86. https://doi.org/10.34007/ppd.v1i1.174

Owon, O. A. S., Sastraatmadja, A. H. M., Prasetyo, E., Nasa, R., Amaludin, R., Sani, Y. S. Y. M., & Ndori, V. H. (2024). Pengantar Ilmu Pendidikan " Teori dan Inovasi Peningkatan SDM" (N. Mayasari & A. H. M. Sastraamadja, Eds.; Pertama (2024)). WIDINA MEDIA UTAMA.

Pribadi, R. A., Azizah, M., & Efendi, R. S. (2023). Kinerja Guru Penggerak Dalam Kurikulum Merdeka. Jurnal Ilmu Sosial Dan Pendidikan (JISIP), 7(3), 2598–9944. https://doi.org/10.58258/jisip.v7i1.5495/http

Ramadan, D., & Khaeruddin. (2024). Implementasi Alur Merdeka dalam Meningkatkan Prestasi Peserta Didik Implementation of the Merdeka Flow in Improving Student Achievement. Action Research Journal Indonesia (ARJI), 6(2), 67–75. https://doi.org/10.61227

Ramdani, A., Jufri, A. W., Jamaluddin, J., & Setiadi, D. (2020). Kemampuan Berpikir Kritis dan Penguasaan Konsep Dasar IPA Peserta Didik. Jurnal Penelitian Pendidikan IPA, 6(1), 119– 124. https://doi.org/10.29303/jppipa.v6i1.388

Restian, A., Deviana, T., Nanda, Y., & Saputri, E. (2020). Pengembangan LKS Berbasis Kearifan Lokal di Malang Untuk Siswa Kelas IV SD. Scholaria: Jurnal Pendidikan Dan Kebudayaan, 10(1), 85–91.

Windansari, S. N. R. (2023). PENGARUH MODEL PEMBELAJARAN INKUIRI BERBASIS OUTDOOR LEARNING TERHADAP PEMAHAMAN KONSEP SISWA PADA MATA PELAJARAN IPA SD KELAS IV. MODELING: Jurnal Program Studi PGMI, 10(3), 641–653.

Hummel, D. (2008). *Chapter 17 – The International Vortex Flow Experiment 2 (VFE-2): Objectives and Overview*. RTO-TR-AVT-113, Page 17-1 – 17-20.

Luckring, J.M. and Hummel, D. (2008). *Chapter 24 – What Was Learned From The New VFE-2 Experiments*. RTO-TR-AVT-113. https://doi.org/10.2514/6.2008-383

Mat, Shabudin Bin, Richard Green, Roderick Galbraith, and Frank Coton. "The effect of edge profile on delta wing flow." *Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering* 230, no. 7 (2016): 1252-1262. https://doi.org/10.1177/0954410015606939

Said, Mazuriah, Shabudin Mat, Shuhaimi Mansor, Ainullotfi Abdul-Latif, and Tholudin Mat Lazim. "Reynolds Number Effects on Flow Topology Above Blunt-Edge Delta Wing VFE-2 Configurations." In *53rd AIAA Aerospace Sciences Meeting*, p. 1229. 2015. https://doi.org/10.2514/6.2015-1229

Luckring, James M. "Initial experiments and analysis of blunt-edge vortex flows for VFE-2 configurations at NASA Langley, USA." *Aerospace Science and Technology* 24, no. 1 (2013): 10-21. https://doi.org/10.1016/j.ast.2012.02.005