

Original Research

Implementation of the *Merdeka* Curriculum in Physics Learning

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ABSTRACT

The issue of the suitability of the learning process with the *Merdeka* Curriculum is something that has not been researched much so far since the change of curriculum in Indonesia. This research aims to reveal (1) the suitability of teacher lesson plans with the *Merdeka* Curriculum, and (2) the suitability of classroom learning with the module design and the *Merdeka* Curriculum. This research was conducted at a private school in Malang City. Data collection was carried out by conducting observations for 4 classes and interviewing 3 physics teachers. The research results showed that (1) based on the 15 aspects we observed in the lesson plans that had been designed by teachers, only 3 (20.00%) were in accordance with the demands of the *Merdeka* Curriculum; and (2) discrepancies are still found between classroom learning activities with the RPP and the *Merdeka* Curriculum.

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1. INTRODUCTION

The quality of education in a country is inextricably linked to curriculum design. The curriculum plays a crucial role in the educational process (Priestley & Philippou, 2019; Yuliza, 2022), as well as in achieving educational goals (Hidayani, 2017; Nistiti, 2022). The curriculum must be dynamic and adaptable to the demands of the times. Therefore, the effectiveness of the curriculum in achieving learning objectives must be continuously measured and evaluated. The results of the evaluation of the curriculum implementation will form the basis for curriculum revision and/or development.

Currently, Indonesia is trying to solve its education problems by changing the current curriculum, from the 2013 Curriculum (K-13) to the *Merdeka* Curriculum. K-13 views that learning should focus on symptoms or phenomena that exist in the surrounding environment (for example, social, cultural, and natural phenomena) through a scientific approach (observing, questioning, trying, processing, and communicating) (Anwar, 2014). In its implementation, K-13 was seen to have several weaknesses, so some improvements were needed. On February 11, 2022, the Indonesian Minister of Education, Culture, Research, and Technology officially launched the *Merdeka* Curriculum as an improvement on the previous curriculum.

The *Merdeka* Curriculum is considered to have several advantages. One of the advantages of the *Merdeka* Curriculum is that it focuses more on students' mastery of essential material and the development of student competencies at their respective stages (Rahmadayanti & Hartoyo, 2022). Thus, students are expected to

learn better and not rush because the learning process is more tailored to their learning phase. The *Merdeka* Curriculum is considered more relevant to the current situation because it emphasizes projects that provide students with ample opportunities to explore current issues. Project-based learning is one way to support the development of character and competencies in line with the Pancasila Student Profile.

The *Merdeka* Curriculum is currently not being implemented simultaneously and on a large scale. This refers to the policy that gives schools the freedom to use the curriculum. However, based on data compiled by the Ministry of Culture, Research, and Technology in 2022, it shows that 3,607 schools from early childhood education, elementary school, junior high school, and high school levels are ready to implement the *Merdeka* Curriculum (IKM). Although many schools are ready to implement the *Merdeka* Curriculum, many problems or inconsistencies have been found in the IKM (Purani & Putra, 2022; Susanti et al., 2023).

No matter how well the curriculum is designed, it will still not have a significant impact on the achievement of educational and learning objectives if teachers and schools still face obstacles in implementing the curriculum. Many studies have been conducted on the readiness of students, teachers, and/or schools in this IKM. These studies have been conducted at the elementary school level (Aprima & Sari, 2022; Indriani et al., 2023; Sumarsih et al., 2022; Syaripudin et al., 2023), junior high school (Miladiah et al., 2023; Nabilah et al., 2023; Numertayasa et al., 2022; Saadah & Amarullah, 2023), as well as high school (Armadani et al., 2023; Khairatunnisa, 2022; Redana & Suprpta, 2023; Septiani et al., 2022).

There have been many studies on IKM at the elementary to high school levels. However, there have not been many studies focusing on IKM in specific subjects, including physics. There have been several studies on IKM in physics. Arrohman & Lestari (2023) conducted research on the diversity of student learning styles, with the results showing that students were dominated by the auditory learning style. Sari et al., (2023) have described how physics learning tools using the PBL model can be applied in the *Merdeka* Curriculum. In relation to learning in the *Merdeka* Curriculum, Etikamurni et al., (2023) focus on applying differentiated Discovery Learning to increase students' motivation to learn physics. Other researchers have focused their attention on revealing the standardization of physics laboratories in supporting the implementation of the *Merdeka* Curriculum (Kusyanti, 2023).

Based on research conducted in IKM in Physics, there has been no research on how teachers' lesson plans in the classroom are aligned with the *Merdeka* Curriculum and its implementation in classroom learning. This is important to provide an overview of the implementation of the *Merdeka* Curriculum in classroom learning. Learning achievement is influenced by the teacher's lesson plan and how the teacher implements the plan in the classroom (Anton & Usman, 2020; Bararah, 2017; Putrianingsih et al., 2021). No matter how good the curriculum is, if the teacher's lesson plan and classroom learning are not in line with the curriculum, the objectives of the curriculum will not be achieved. Therefore, this study aims to reveal (1) the suitability of the teacher's lesson plan with the *Merdeka* Curriculum, and (2) the suitability of classroom learning with the lesson plan and the *Merdeka* Curriculum.

2. METHOD

This study uses a qualitative approach. It was conducted at a private school in Malang City that has been implementing the *Merdeka* Curriculum. This school was chosen because the principal and teachers were ready to implement the *Merdeka* Curriculum. This was evident from the fact that the principal and teachers had participated in several *Merdeka* Curriculum workshops. In addition, the implementation of the *Merdeka* Curriculum at this school was already in its second year. The subjects of this study were 10th-grade physics teachers at the school.

Data was obtained from several methods. The suitability of the lesson plans (RPP) with the *Merdeka* Curriculum was assessed using document analysis. The instrument used in this document analysis was a rubric designed to assess the suitability of the lesson plans with the *Merdeka* Curriculum. The suitability of the learning with the lesson plans was assessed using observation. The observation was conducted in the classroom learning on the subject of Quantities and Measurements. There were four classes observed. The instrument used in this observation method was an observation sheet. In addition, to support the findings, interviews were conducted with three physics teachers in this study.

The rubric for assessing the suitability of lesson plans with the *Merdeka* Curriculum is compiled using several indicators. These indicators were obtained from a study by Arrohman & Lestari, (2023), and the *Merdeka* Curriculum guidelines document (KEMENDIKBUDRISTEK, 2022). Based on the indicators that have been compiled, 15 statements were developed using a dichotomous scale, with 1 for "yes" and 0 for "no."

The observation sheet is designed to observe the learning process that takes place to see the suitability of learning with the lesson plan and the *Merdeka* Curriculum. The observation sheet was developed to examine six aspects of learning, namely (1) perception and motivation, (2) teaching materials, (3) management of learning resources/media, (4) learning strategies, (5) reinforcement/consolidation, and (6) evaluation.

Data analysis was conducted by determining the percentage of indicators of conformity between the lesson plans and the independent curriculum. For qualitative data, analysis was conducted starting from the data collection stage, data reduction, data presentation, and conclusion drawing, as per the steps in the Miles and Huberman analysis (Taqwa et al., 2017; Yusuf, 2016).

3. RESULTS AND DISCUSSION

3.1. Alignment of Lesson Plans with the *Merdeka* Curriculum

Based on the 15 aspects (A1-A15) of assessment that we have developed, we found that the suitability of teaching modules to the *Merdeka* Curriculum is still very low. There are 3 (20.00%) aspects that show compatibility between the teaching modules and the *Merdeka* Curriculum. The aspects we assessed in the teaching modules were whether the module design had (1) designed differentiated learning (A1); (2) been designed taking into account the heterogeneity of students' learning styles (A2); (3) taking into account the developmental stages of students (A3); (4) designing student-centered learning (A4); (5) showing a higher proportion of formative assessment than summative assessment (A5); (6) designing collaborative and group project-based learning (A6); (7) designing learning to build capacity to become lifelong learners (A7); (8) designing learning that supports the holistic development of students' competencies and character (A8); (9) designing learning that is tailored to the context, environment, and culture of students (A9); (10) designing learning that is designed so that the activities carried out can be linked to real conditions, including showing real problems that must be solved/resolved (A10); (11) designing learning that involves parents and the community as partners (A11); (12) designing learning that is oriented towards a sustainable future (A12); (13) designing learning that shows educators asking open-ended questions (A13); (14) designing learning that includes assignments that train reflection and synthesis skills (A14); and (15) designing learning that involves many references and learning resources (A15). Aspects that are and are not in accordance with the *Merdeka* Curriculum criteria are shown in Table 1.

Table 1. Aspects that are and are not in line with the *Merdeka* Curriculum criteria

	Aspects
Compliant	A3, A4, A15
Non-compliant	A1, A2, A5-A14

The high school where we conducted our research has implemented the independent curriculum, but in practice, the learning design still does not follow the requirements of the Independent Curriculum. Teachers also still experience difficulties in implementing the independent curriculum (Ndari et al., 2023; Zidan & Qamariah, 2023). One of the things that is still not in line is the absence of teaching modules to replace the lesson plans. Therefore, in this study, the documents we analyzed were lesson plans, not teaching modules to replace lesson plans. Of the 15 aspects we assessed in the lesson plan design, the components in the learning design still do not show conformity with the learning desired in the independent curriculum. Based on the results of interviews we conducted with several physics teachers, the lesson plans used in learning are still the old lesson plans and have not been adjusted to the independent curriculum.

In the first aspect, regarding differentiated learning design, there is no specific design from teachers in implementing differentiated learning activities. This finding is based on two things, namely the analysis of lesson plans and interviews with teachers. The learning activity design carried out by teachers in the lesson plans is shown in Figure 1. In the core activities, the learning design is carried out by providing material by the teacher and holding discussions with students. Basically, differentiated learning is learning that is designed to facilitate all students who are heterogeneous so that they can participate in learning to the maximum extent possible. Teachers play a vital role in differentiated learning in stimulating and guiding students in realizing their potential (Geletu & Mihiretie, 2022; Halil et al., 2024; Wibowo et al., 2025; Anggoro et al., 2024). However, in designing differentiated learning, teachers do not need to design learning for each student who has similar characteristics. Teachers only need to design learning in such a way that it can help all students (whether they have sufficient or insufficient prior knowledge, with visual, auditory, or kinesthetic learning styles; with high or low abilities or comprehension; and so on).

B. Kegiatan Pembelajaran

Tahapan	Pertemuan ke-/Topik Materi		
	Besaran, satuan dan dimensi	Angka penting dan Notasi ilmiah	Alat ukur dan pengukuran
Pendahuluan	Menyapa, memberi salam dan mengecek kehadiran peserta didik. Menyampaikan materi awal untuk memancing minat belajar siswa.		
Kegiatan Inti	Guru memberikan materi dan mengadakan diskusi bersama peserta didik tentang: 1. Besaran dan satuan 2. Analisis dimensi	Guru memberikan materi dan mengadakan diskusi bersama peserta didik tentang: 1. Angka penting 2. Aturan penulisan angka penting 3. Notasi ilmiah	Guru memberikan materi dan mengadakan diskusi dan praktikum bersama peserta didik tentang: 1. Prinsip pengukuran 2. Alat ukur panjang, massa, dan waktu (jangka sorong, mikrometer sekrup, neraca)
Penutup	Guru melanjutkan pada penugasan untuk menganalisis dari beberapa dimensi besaran fisika	Guru meminta peserta didik memberikan kesimpulan tentang pembelajaran hari ini.	Guru meminta untuk melakukan presentasi mengenai lks pengukuran yang telah dikerjakan
Sumber belajar/ Alat belajar	Sumber belajar: Buku Teks Fisika kelas X Alat belajar: Powerpoint, thatquiz, simulasi PhET		

C. Penilaian Hasil Belajar

(1)	Penilaian Sikap	: Keaktifan dalam diskusi
(2)	Penilaian Pengetahuan	: Penugasan
(3)	Penilaian Keterampilan	: Percobaan mandiri pengukuran

Figure 1. Learning Activity Design and Learning Outcome Assessment

In the second aspect, the lesson plan is designed based on the heterogeneity of students. Based on interviews conducted with teachers, the lesson plan is given to all students in general. There is no specific consideration of student heterogeneity. One important aspect that needs to be considered in learning is the initial ability and absorption capacity of students. In addition, because each student is a unique individual, it is also necessary to consider other factors such as potential, characteristics, personality, identity, talent, and even their awareness to learn. With this diversity, teachers must be able to manage the class well so that positive interactions can be built between students, and they can work together to complement each other. This is important to foster a sense of tolerance and cooperation among students. On the other hand, if student heterogeneity is not managed properly, it can become a source of various problems in the classroom (Frenzel & Buric, 2021; Lee et al., 2022; Turan et al., 2022).

In the third aspect, the RPP has shown consideration for the developmental stage of students. According to Piaget, at the high school level, students should have reached the formal operational stage of cognitive development. They should be able to solve problems that require a high level of logical reasoning. This period is characterized by the ability to operate formal logical rules that are no longer bound by concrete objects (Suryaman, 2020). Based on the results of our interviews, teachers believe that the learning process is in line with the developmental stage of students who have reached the final stage of development.

- Peneliti : *apakah rancangan pembelajaran ini sudah sesuai Pak dengan tahap perkembangan peserta didik? (Is this learning plan appropriate for the developmental stage of the students?)*
- Guru : *Iya, berdasarkan tahap perkembangan kognitif, siswa sudah mencapai tahap operasional formal. Dan kegiatan pembelajaran yang saya rancang dapat diikuti dengan baik oleh siswa pada tahap itu. (Yes, based on their cognitive development stage, the students have reached the formal operational stage. And the learning activities I designed can be followed well by students at that stage.)*

In the fourth aspect, the learning design already includes learning with a student-centered approach. Teachers have prepared Student Worksheets (LKPD) to build students' abilities in using measuring instruments, namely rulers, calipers, and micrometers. With the help of LKPD, students are given the opportunity to build their own knowledge through activities designed by teachers (Zainuddin, et al., 2022). Although the lesson plan includes a student-centered learning design, two of the three learning meetings designed are still dominated by teachers. Only the third meeting is designed for students to carry out practical work.

In the fifth aspect, the independent curriculum requires that in learning, teachers must carry out formative assessments in greater proportion than summative assessments. In the lesson plan design, only the sources of assessment in terms of attitude, knowledge, and skills are mentioned. There is no mention of how student information is collected during learning, so it is not yet apparent that formative assessments are carried out more

frequently during learning. Until now, teachers have indeed used summative assessments more frequently and are more accustomed to summative assessment than formative assessment (Yildirim et al., 2024; Allali & El Ghouati, 2025; Clinton & Hattie, 2024).

In the sixth aspect, lesson plans are still not designed using a collaborative and group project-based approach. Learning tends to be designed with teachers providing material, resulting in more knowledge transfer processes. Based on the demands of the independent curriculum, learning is expected to be carried out collaboratively and based on group projects (Fahlevi, 2022; Suryaman, 2020; Syamsuddin et al., 2022), where such learning will be useful in achieving the demands of 21st-century skills.

The seventh aspect is building capacity to become lifelong learners. Basically, education is a lifelong process. Encouraging students to be enthusiastic about lifelong learning, which includes awareness of the importance of self-development and continuous improvement of competencies, is important in the *Merdeka Belajar Curriculum* and *Merdeka Campus* (Cahya et al., 2023). Based on the confirmation in the interviews we conducted, teachers also confirmed that they had not yet designed lesson plans to encourage students to become lifelong learners.

The eighth aspect is supporting the holistic development of students' competencies and character. Holistic learning can be simply defined as learning that facilitates students to develop their full potential harmoniously, including intellectual, emotional, physical, social, aesthetic, and spiritual potential (Hartoyo et al., 2019; Widyastono, 2012). In the designed lesson plans, the learning process is more directed at developing only the intellectual aspect. This finding is also supported by the results of interviews with teachers, which show that the implemented learning design aims to transfer an understanding of physics material to students.

The ninth aspect is designing learning that is tailored to the context, environment, and culture of the students. The lesson plans prepared by teachers do not yet reflect this aspect. In curriculum or important number learning, cases or phenomena that exist around students can be used in the design. This is important so that students can relate what they are learning to their lives. Thus, the learning they do in class is not 'separate' from their lives. If learning is presented without relating it to the daily lives/environment of students, then this can be one of the factors that make it difficult for students to understand the material (Irawan & Kencanawaty, 2017), and on the other hand, the learning also becomes meaningless.

In this tenth aspect, learning is actually more directed towards problem-based learning, with the problems raised being everyday problems. The lesson plans designed at the school still use knowledge transfer learning from teachers to students. Learning does not begin with contextual problem solving. The independent curriculum recommends that learning should be carried out by solving contextual problems. With learning designed to solve contextual problems, there will be many aspects that can be developed in students, such as problem-solving skills (Haryadi, 2020; Hudha et al., 2017), and making students more sensitive to the problems around them.

The eleventh aspect is designing learning that involves parents and the community as partners. In this aspect, the lesson plans have not yet been designed to involve outside parties. However, this aspect is one of the requirements of the independent curriculum, which, upon review, does have a positive impact on student development. Students can learn directly from experts and be introduced firsthand to how concepts are applied in industry by people who are directly involved in that world. However, this does pose its own challenges if it is to be implemented in schools. Based on interviews with teachers, this type of learning is not carried out in classroom subjects, but schools have an agenda to invite practitioners with the aim of socializing important values in social, national, and state life. For example, socialization about obeying traffic rules and the dangers of drugs.

The twelfth aspect is that the lesson plan designs learning that is oriented towards a sustainable future. In this aspect, the lesson plan does not yet show this aspect. However, based on the interview results, teachers said that in their teaching, they conveyed how the material that students learned would be useful in the world of work and would therefore be useful for students in the future.

In the thirteenth aspect, namely the lesson plan designs learning that shows educators asking open-ended questions. This aspect is also not yet apparent in the lesson plan design. Students are still not given the opportunity to ask open-ended questions. Open-ended questions are questions that invite varied answers/responses. Open-ended questions allow for a wider range of possible responses compared to closed questions (Widodo, 2006). With open-ended questions, students will have ample opportunity to explore the things they want to know. This will certainly have a positive effect on the development of students' thinking skills.

The fourteenth aspect is designing learning that includes assignments that train students' reflection and synthesis skills. This aspect is not yet apparent in the lesson plans designed by teachers. Based on the interview results, the assignments given by teachers to students are identical to the questions given in class. This is intended to help students better understand what they have learned in class.

The last aspect, or the fifteenth aspect, is designing learning that involves many references and learning resources. In this aspect, teachers have sufficiently designed learning that utilizes several learning resources, namely textbooks, PowerPoint presentations, ThatQuiz, and PhET simulations. The wealth of learning resources can have several positive effects on students, one of which is preventing students from getting bored easily.

3.2. Alignment of Learning with Lesson Plans and the *Merdeka* Curriculum

Based on the 15 aspects considered in the lesson plan, there are three (20.00%) aspects that appear to be included in the lesson plan. These results indicate that the learning design by teachers is still not relevant to the demands of the independent curriculum. This section will discuss the suitability of learning implementation with the lesson plan and the Independent Curriculum.

In terms of teaching implementation, based on four observations of teaching, we found that the teaching conducted by teachers still had several aspects that were not in accordance with the teaching module/lesson plan. Teaching was conducted entirely using a teacher-centered approach. From the beginning to the end of the lesson, the teacher was in complete control. Teaching was carried out using the lecture method, with the teacher explaining the material with the help of PowerPoint (PPT) slides. There was no group discussion process in the learning process, which was not in accordance with the teacher's lesson plan. According to the teacher, if students were asked to form groups, the learning process would take a long time, and the material would not be covered. This was based on past experience.

In addition, the learning module/lesson plan included an assessment of skills based on experiments, but the teacher did not conduct any experiments during the learning process. The reasons why the teacher did not conduct experiments were (1) the limited number of measuring instruments, (2) students tended to take a long time to conduct experiments and fill out the Student Worksheet (LKPD), and (3) there was not enough learning time if students had to conduct experiments.

In the assessment activity, the teacher gave questions to measure students' understanding of the material that had been taught. Based on the interview results, teachers also did not measure student learning outcomes in terms of attitude and skills. In relation to formative assessment, in the implementation of classroom learning, teachers gave 3-5 questions in stages to be answered by all students. Students who finished the questions quickly would come to the front to have their answers checked by the teacher. Students who finish the questions then come forward to submit their work to the teacher, and those with correct answers receive "points" that are recorded in a special book. However, the number of students who come forward is limited to a certain number, so not all students receive points. This has a positive impact because students appear enthusiastic about completing the questions quickly. On the other hand, for slow students, this is actually an obstacle. Based on our observations, there were several students who appeared unable to complete the questions and did not discuss with other friends, so they tended to be passive during the learning process.

Based on our findings in the learning observations that have been carried out, we see that the learning is not yet fully in accordance with the lesson plan design. And many aspects are still not in accordance with the implementation of the independent curriculum in physics learning in the classroom.

4. CONCLUSION

The demands of the independent curriculum in learning activities have taken many aspects into consideration in order to improve the quality of education in Indonesia. However, in its implementation, schools, teachers, and students must prepare many things so that the learning process can run as desired by the independent curriculum. We found that schools that have implemented the independent curriculum are not yet fully prepared and in line with the independent curriculum. There are still schools that have not designed learning modules in accordance with the independent curriculum. The learning design is still in the form of lesson plans that are not in line with the aspects required by the independent curriculum. On the other hand, the learning that is carried out in the classroom is also still far from the requirements of the independent curriculum.

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DECLARATION OF INTEREST

There is no conflict of interest in this study.

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ETHICAL STATEMENT

The research has received ethical approval from the Ethics Committee, Universitas Negeri Malang, Indonesia.

AI USE STATEMENT

The study findings and their conceptualization are original and are not AI-generated.

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